

# tsdsi NEWSLETTER

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## MESSAGES



### From the **CHAIR'S DESK** **The Patenting dilemma -** **"Simplicity of the Solution" vs "Complexity of the Problem"**

Dear Readers,

As we all know, 3GPP is a massively collaborative, detailed engineering effort that develops new technical standards based on the contributions of different parties, including OEMs, operators, end-users, R&D organizations, and the government. Decisions in 3GPP are technology-driven and result from a consensus-based process open to all members. 3GPP members submit technical contributions which are discussed openly in 3GPP meetings. Any member can comment, improve, or reject a contribution at any time, often iteratively until everyone agrees as fit for purpose.

The concept of Digital Public Good Infrastructure for the betterment of society has captured the imagination of the world during India's G20 presidency. The Digital India Stack and our 4G/5G solutions – both of which are based on globally accepted standards - are being offered to the world at large now. Designing products based on standards result in the creation of well-performing systems, products, and services ensuring compatibility, interoperability, safety, and quality.

Designing such products for global good comes with huge responsibility of being at the cutting edge of technology, innovation, and quality. All the R&D efforts including the innovations, patents will have greater leverage and protection only when they find their way into global standards. Contributing to standards, therefore, must be treated strategically at each of our enterprises and academia alike. We ought to recognize that working on standards is a full-time job like R&D and we should form and be part of a 'standards community' that can take our requirements, innovations, and solutions to the global stage. We should also consider measuring our capabilities on standards development & contribution on a defined maturity framework.

As the next generation of networks are going to be defined more by software and algorithms, we in India, can innovate and contribute to the evolution of 5G Advanced and 6G technologies placing global good at the center across several dimensions like Sustainability, Experience, Technology, Application and Manufacturing et al.

In the last few years, I had the opportunity to visit several start-ups, OEMs, research institutions based in India. I was impressed by their work ethic, passion, and dedication to research & innovation. However, I also observe that at times we undermine our own innovation by not patenting it appropriately. We sometimes tend to trivialize the innovations by looking at the 'simplicity of the solution' (because of the innovation) rather than the 'complexity of the problem' solved. It is critical for us to communicate that all innovations are worth patenting and can rightfully be brought-in as contribution to standards, however trivial one may feel about it. Let the community be the jury!

Let us renew and energize our efforts to the cause of telecom standards and standardization and achieve the aspiration set for us by our Hon'ble Minister for Communications Shri Ashwini Vaishnaw i.e "India to aim for 10% of all 6G patents and 1/6 th Contributions to Standards". TSDSI is playing a vital role in nurturing the standards development ecosystem in India. Our Standards Driven Research initiative, outreach activities and constant endeavor to bring meetings of global SDOs to India have been designed with this goal in mind.

I take this opportunity to sincerely appreciate and thank you for your support to TSDSI.

Regards,

**N G Subramaniam**

## ANNOUNCEMENTS



### **TSDSI approves Standard on Cloud Interoperability and Portability**

### **TSDSI adopts ATSC 3.0 standards**

### **TEC adopts TSDSI Transposed 3GPP Release-17 Standard as National Standards**

### **TSDSI constitutes Test and Certification Task Force**

### **Mr N Mohanram takes charge as Director General, TSDSI on 10 April 2023**



## DG SPEAK



Dear Members,

I assumed the role of Director General of TSDSI on April 10, 2023. The landscape of Telecom Standards development in India is currently in an exciting phase. With notable achievements in 5G standards, all eyes are on TSDSI to lead the nation's efforts in establishing a prominent role in the next generation of standards. Being a part of this journey is a truly remarkable privilege.

My professional background lies in research, technology development, and the deployment and operation of secure cyber infrastructure, primarily in the domains of high-speed networking, high-performance computing, and financial technologies.

In these fields, standards play a pivotal role, serving as the essential criteria for creating products and solutions through the collaborative efforts of teams developing interoperable components for different modules. Joining TSDSI has transitioned me from the consumer side of standards to the "producing" side.

In my initial weeks at TSDSI, I've closely observed members from diverse verticals, including operators, manufacturers, service providers, R&D institutions, academia, policymakers, and user departments. They bring their specific expertise to the table, conducting technical studies and collaboratively developing specifications. This diversity ensures a holistic examination of topics from various perspectives. Additionally, our governance principle of providing a balanced representation, with a maximum of two seats for each segment in the telecom ecosystem, prevents any single segment from unduly influencing organizational decisions.

I'd like to acknowledge the significant contributions of my predecessor, Ms. Pamela Kumar, who served as Director General from February 2017 to April 2023. Under her leadership, TSDSI evolved into an agile and high-impact organization, gaining recognition in the global ecosystem. We have successfully tracked our growth by enhancing technical activities, increasing our impact in global forums, and striving to develop TSDSI as a world-class institution, as evidenced by the performance dashboard presented later in this message. I intend to continue these strategies as guiding principles for our activities, and I've outlined our approach for FY 23-24.

Our ongoing efforts involve steadily increasing membership and enhancing member engagement in technical activities. We are actively working to host global standards development meetings, particularly those of 3GPP and oneM2M, in India. We are also planning a series of standards outreach workshops across various regions of the country to raise awareness and inspire greater community involvement in standards-related initiatives.

I am pleased to note that the Cloud Interoperability and Portability standard, developed by TSDSI members, has been successfully published. Additionally, we have officially embraced the ATSC 3.0 standards, specifically designed for TV broadcasting and also presented it to Telecom Engineering Centre for consideration and potential adoption as National Standards.

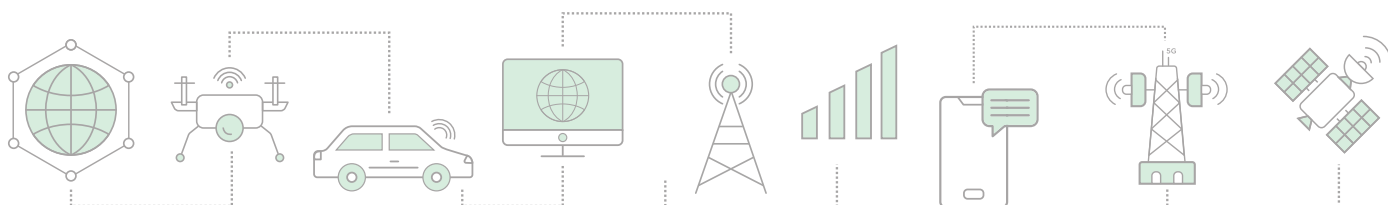
While startups and research have been driving advances in digital technologies, their participation in formal standards development activities is currently not proportionate. We are drawing on the recommendations from TSDSI's Task forces on Startup Engagement Strategy and SDR as a reference point to address this issue. In the global arena, multiple channels exist for contributing to standards, and I propose to focus on building synergies with peer forums to align our collective efforts, enhancing our global impact. Additionally, strengthening TSDSI's infrastructure is essential to improve member experiences and optimize resource utilization.

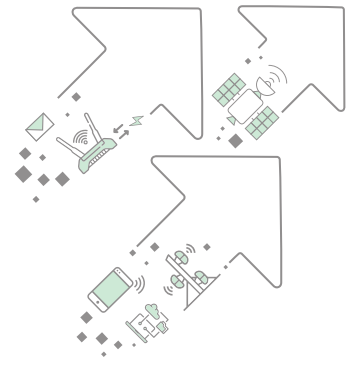
With our established track record, there are high expectations for TSDSI to lead standards development in the domains of Beyond 5G, 6G, and services & applications. We also see an opportunity to channelize research efforts toward standards development within the country and engage with relevant entities in developing and emerging economies to facilitate their participation in the global standards dialogue.

I extend my heartfelt gratitude to the TSDSI Leadership, Members, and my colleagues at the Secretariat for their unwavering support as I acclimate to TSDSI and the dynamic world of standards. I encourage you to reach out with your suggestions on how we can collaboratively position India as a leader in the telecom standards ecosystem through TSDSI. I look forward to meeting you at one of our TSDSI meetings or events soon.

Regards,

**N Mohanram**





## Performance Dashboard

### Performance FY'22-23

#### Enhancing Technical Activities

- Avg. 10 Contributions, 31 members (60 attendees) per SG meeting
- Published 8 Technical Reports
- TSDSI Transposed Standards (oneM2M, 3GPP) adopted/being adopted by TEC as National Stds

#### Higher Impact in Global Forums

- Avg. Delegates/mtg: 10@ITU-R, 12@3GPP, 17@oneM2M
- Avg. Contributions/mtg: 15@3GPP; 1@ITU-R, 3@ITU-T, 36@oneM2M
- No. of IMs: 55@3GPP, 58@oneM2M
- Contribution on Framework for IMT-2030 and Beyond in ITU-R WP5D
- Secretariat Support to 3GPP and oneM2M (ongoing)

#### Establishing A World Class SDO

- 105 members
- Standards Driven Research
- Sector Member of ITU-T & ITU-R, and ITU-T A.5 Certified
- S/W Copyright Policy & Trademark Guidelines published

### Approach for FY'23-24

#### Enhance Technical Activities

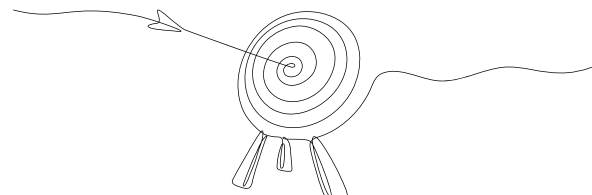
- Enhance participation in Technical Meetings to 60% membership per meeting
- Update the Roadmap to cover emerging areas and needs
- Adopt Standards from relevant forums based on recent India requirements (including IEEE SA)
- Facilitate creation of standards based on recommendations of technical reports
- Promote TSDSI activities through Liaisons to relevant stakeholders, leading to new engagements
- Enhance Focus on Spectrum Studies and new Verticals

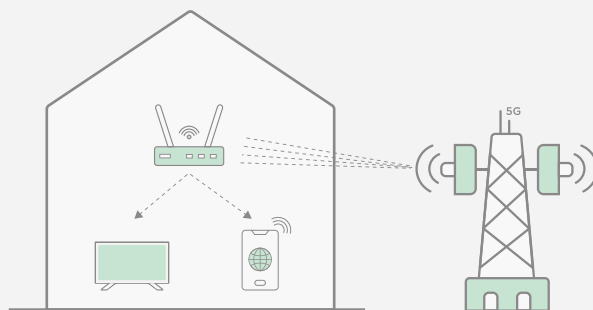
#### Create Higher Impact in Global Forums

- Synergy with TEC, WPC and BIS
- Global SDOs Mapping & Tracking Framework (to promote participation and timely contributions)
- Foster effective engagement of Members in 3GPP, oneM2M and ITU (prep meetings & awareness workshops, mentoring, sync ups)
- Host Standards meetings in India – DoT/TSDSI
- Engage with identified agencies/forums within and outside India for early alignments and collaborations

#### Make TSDSI as a World Class SDO

- Strengthening the Secretariat including the processes
- Grow Membership by 20%
- Mobilize Members and provide Hand holding support to ensure participation and contributions
- Leadership positions in Global Forums
- Develop Standards champions/coaches from among members





## Standardization Activities

### Study Group - Networks

#### Technical Reports Released:

• **Technical Report on “Limitations of the Existing Relay (IAB) Architecture in 3GPP 4G LTE & 5G Networks” (TSDSI TR 6022 V1.0.0):** This report describes existing 5G NG-RAN & IAB Architecture, analyses limitations of the existing 3GPP based LTE Relay and 5G IAB architecture and recommends requirements/scope for a new 5G IAB Relay Solution.

**Work on development of technical specifications on the following topics is in progress:**

#### 6G:

• **Methods and Interface Design for RIS-assisted Communication Systems [WI1-NIP284]:** This work item will address abstractions for various configurable attributes, parameters and define the signalling required in a typical RIS. It will provide various applications/possible deployment scenarios.

• **6G Network Architecture Requirements [WI1-NIP290]:** To specify overall architectural elements of a 6G network especially the L2/L3 architecture for 6G, an open Security protocol which can be composable based on the specific security needs of nation states.

• **AI Architecture for RAN [WI1-NIP313]:** This work item aims to develop methods of realizing SON / RRM functionality local to the RAN entity and address issues of affordability. The specifications will be designed in such a way that it can be a plugin into the 3GPP or any other 6G RAN nodes.

• **Coreless RAN [WI1-NIP 314]:** The objective of this Work Item is to support a coreless network for UAV type operations or in 6G cellular networks. Its Study Phase will include study of device handling (authentication and authorization) mechanisms at the RAN independent of the core, possible mechanisms for data breakout from the RAN itself for enterprise coreless operations, data aggregation at the RAN node itself when core network or a backhaul service is not available, possibility of accommodating Core element proxies at the RAN and accommodating intermittent core network connections etc.

#### 5G Enhancements:

• **5G Extensions for Broadcast Offload [WI1-NIP226]:** This activity is currently in its Study Phase and a technical report has been approved in the technical plenary meeting held on 7-8 June 2023.

• **Functional Split and Fronthaul Interface in FBS Driven C-RAN for 5G and Beyond [WI1-NIP 270]:** The work item aims to Standardize the split selection criteria and method for transition of split options; standardise the new fronthaul interface for different split options and Selection of frequency band for wireless fronthaul.

#### Wireless Backhaul:

• **Evaluation of the existing IAB architecture in 5G Networks [WI1-NIP 248]:** A Technical Report mentioned above has been published as part of the study phase of this activity, Specifications are now being developed.

• **Technical Characterization of E-band for 4G/5G Backhaul & Rural Broadband [WI1-NIP 258]:** The Work Item is currently in its Study Phase. Technical report is in final approval stages.

**Work on development of technical reports on the following topics is in progress:**

#### 6G:

- 6G Waveforms: Scenario, KPIs, spectrum and candidates [SI 96]
- Defining qualitative metrics for 6G KPI definitions [SI 97]
- Study on channel modeling and physical layer requirements for near-field communication in 6G networks [SI 107]
- Joint communication & sensing in 5G networks & beyond [SI 108]

#### 5G Enhancements:

- Dynamic Joint Deployment of SDN Controllers and Hypervisors for Frugal 5G and Beyond [SI 80]
- Futuristic architecture of 5G Backbone and Slicing [SI 95]
- Unified network slicing model [SI 109]

#### Spectrum Studies:

- Study of 6 GHz spectrum for license-exempt wireless applications in India [SI 74]
- A Case Study for Sub-THz Channel Modeling [SI 100]

**The group took up discussions on a proposal for:**

- Full Duplex NB-IoT devices for Smart Monitoring (NIP 305)

### Study Group - Services and Solutions

#### Specifications on Cloud Interoperability and Portability [WI1-NIP197]:

These Specifications have been approved by TSDSI GBM as a Standard on 30 June 2023. This first set of normative standards presents use-case-specific architecture and APIs to support cloud interoperability, data portability, and security. It covers scenarios of interoperability concerning cellular networks integration of vertical industry data, hybrid cloud management, analytics, data portability and interchange for smart cities, application portability, interoperability architecture, data models and security.

#### Technical Reports Released:

• **Technical Report on “Need of Post Quantum Cryptography in 5G Networks” (TSDSI TR 6021 V1.0.0):** This report presents an analysis of the existing security algorithms in 5G Networks based on the released 3GPP standards and evaluates the potential threats of Quantum Computing to these Security Algorithms. It also reviews technical activities in other SDOs, Industry bodies, development of incremental recommendations and proposals.

• **Technical Report on “Digital Process For Know Your Machine Custodian” (TSDSI TR 6013 V2.0.0):** This report establishes a trust and compliance framework for M2M device and custodian verification including unique characteristics of M2M connections and its ownership & requirements for the verification of these connections. First version of this report was published in September 2021.

• **Technical Report on “Study of UAV/Drone 3GPP standards applicability to India use cases” (TSDSI TR 6025 V1.0.0):** This report highlights enhancements in the 5G architecture related to UAV/Drone provisioning, identification, tracking, security, application specific network capabilities and deployment models etc. It also provides the status of standards development work in India and global forums, including new features introduced in 3GPP Release 17 to Indian scenarios.

## ACTIVITIES

- **Technical Report on "Rural Broadband Services & Architecture" (TSDSI TR 6023 V1.0.0):** This report studies use case requirements in the rural setting for key applications that typically require high bandwidth low latency, low bandwidth of IoT/Transactional nature, emergency services and disaster management etc.

**Work on development of technical specifications on the following topics is in progress:**

### 6G:

**Integrated communication and sensing at the Application level [W11-NIP310]:** This proposal was approved as a Work Item in the June 2023 Technical Plenary. It will have a study phase which will list use cases and sensing data that can be provided by application level sensing information sharing, provide a framework for a UE and/or network assisted application-level sensing and explore both outdoor and indoor Spatial sensing as a service to users external to the network.

### 5G Enhancements:

**Architecture to support tactile applications with edge intelligence over 5GS [W11-NIP 282]:** This will specify the architecture to support tactile application with edge intelligence over 5GS. The procedures, messages, and API details for enabling edge intelligence in tactile applications are based on the service aspect requirements.

### Application Layer:

**A local language repository as an enabler for financial workflows [W11-NIP 279]:** This Work Item will create a database of icons and terms in Indian languages for financial transactions as per the details in TSDSI Technical Report (TSDSI TR 6014 V1.0.0) on Support for Indian Languages in Mobile Transactions. It will enable bringing regional communities (through the 22 scheduled languages of India) under the SDG umbrella for financial security, facilitate automation through re-usable workflows and publish a baseline standard with interface repository, and reference workflows that can be extended/customised by stakeholders.

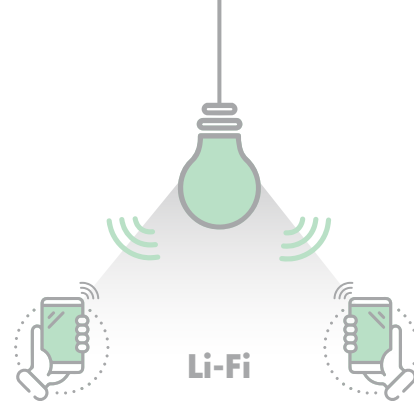
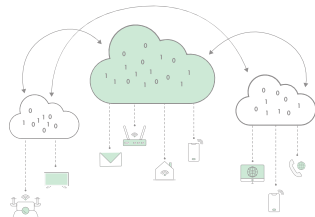
### Services Architecture & Framework:

**Cloud Interoperability & Portability Stage III [W11-NIP 309]:** The Stage III work of Cloud Interoperability and Portability (CIP) will cover the APIs and implementation details for the interoperability concerns related to Cloud Interoperability, Data portability, Compute/Application portability and Security.

**Work on development of technical reports on the following topics is in progress:**

### 5G Enhancements:

- Study on the security aspects of Artificial Intelligence (AI)/Machine Learning (ML) models for 5G applications [SI 103]
- Enhancement of the security and privacy of the user subscription identity in 5G AKA [SI 104]
- A location privacy-preserving scheme to mitigate the authentication relay attack under False Base Station in 5G [SI 105]



### Application Layer:

- Enablement of common ontology for adaptive traffic control system and other Intelligent transportation system products [SI 102]
- System requirements related to Metaverse use cases in mobile network [SI 98]
- Communication Requirement for Energy Sector [SI 87]

### Services Architecture & Framework:

- Common user profile to promote accessibility in audio visual media [SI 76]
- Enablement of common edge connectivity for public utility purposes [SI 101]

### Security:

- IoT Identifier [SI 75]

**The group took up discussions on proposals for:**

- 5G and Beyond Network Security Architecture to support Multilevel End-to-End User Plane Security [NIP 317]

### Snapshot of Technical Activities:

Study Group	Technical Reports		Technical Standards	
	Published	In Progress	Published	In Progress
Networks	10	2	8,413	408
Services & Solutions	133	-	223	-

### List of Technical Meetings held in this period:

Group	Date	Attendees (Member Organizations)	Contributions -NIPs & SWIPs
Networks Technical Plenary	14 - 15 March 2023	61 (44)	9
	7 - 8 June 2023	61 (18)	13
Services & Solutions Technical Plenary	16 - 17 March 2023	73 (31)	11
	7 - 8 June 2023	109 (37)	12



TSDSI TP meetings hosted by NOKIA in Bengaluru in June 2023





## ACTIVITIES



TSDSI welcomes volunteering offers from members and organizations to organise discussion workshops and knowledge sharing webinars on any active study or work items listed on our website. Please contact [outreach@tsdsi.in](mailto:outreach@tsdsi.in) for the same.

### Liaison Statements

#### Incoming LS: Following LS were received in the reporting period:

- Liaison statement from ITU-T JCA-IMT2020: Invitation to update the information in the IMT-2020 and Beyond roadmap
- Liaison statement from ITU-R WP5D to GCS Proponents and Transposing Organizations on the provision of transposition references and Certification C for Draft Revision 2 of Recommendation ITU-R M.2150
- Liaison Statement from ITU-R WP5D to relevant external organizations on timing of updates to IMT-2020 Recommendation ITU-R M.2150 and IMT-Advanced Recommendation ITU-R M.2012 after year 2023
- Liaison Statement from ITU-R WP5D to GCS Proponents and Transposing organizations on the provision of transposition references and Certification C for Draft Revision 6 of Recommendation ITU-R M.2012

#### Outgoing LS: Following LS were sent out in the reporting period:

Response by SG Networks to JCA-IMT2020 on their Invitation to update the information in the IMT2020 Roadmap

Liaisons from Services and Solutions Study group to the Department of Telecommunications (DoT) and the Telecommunication Engineering Centre (TEC) on the following technical reports published by the group:

- Smartphone User Data & Privacy Protection (TSDSI TR 6012 V1.0.0)
- Minimum Technical Requirements for PPDR System Deployment in India (TSDSI TR 6019 V1.0.0)
- Digital Process for Know Your Machine Custodian (TSDSI TR 6013 V2.0.0)
- Post-Quantum Cryptography for Future 5G Networks and Applications (TSDSI TR 6014 V1.0.0)

Liaisons Statements can be viewed at <https://tsdsi.in/liaison-statements/>.

## Strategic Initiatives

### Technology Roadmap Item Proposal (TRIP) Forums:

#### Quantum TRIP Forum:

TSDSI, through the Quantum TRIP forum members, partnered with TEC, C-DOT and IEEE Communications Society Delhi chapter to organize the First International Quantum Communication Conclave on 27-28 March 2023. Ms Pamela Kumar, DG, TSDSI, chaired a session on "Security in the Quantum-Era". A key recommendation from the conference was to set up a Quantum Alliance comprising all stakeholders; encourage cooperation between countries to promote adoption of Quantum Technologies. A need for "Quantum Testbeds" was also expressed. The conference report can be viewed at the link here. The tenure of the forum has been extended till September 2023.

#### IoT-M2M TRIP Forum:

The forum has submitted two proposals to the Services and Solutions Study Group. The tenure of this forum has been extended till October 2023.

#### Automated Electric Transportation TRIP Forum:

The tenure of this forum has been extended till December 2023.

### Standardization Strategy



A TSDSI-BIS-TEC Workshop on standardization was conducted on 21 February 2023. It facilitated mutual appreciation of the standards development activities and processes being carried out by TSDSI, BIS and TEC. It was decided to explore collaboration in a few areas, starting with Artificial Intelligence (AI), Internet of Things (IoT) and Smart Infrastructure.

**Test & Certification Task Force:** The Governing Council in its 41<sup>st</sup> Meeting (held on 23 January 2023) has approved formation of the Test & Certification Task Force. The purpose of this Task Force is to understand the current status of test and certification infrastructure in the country and project the future requirements as we gear up for deployment of 5G and beyond Technologies.

The recommendations made by the Standards Driven Research (SDR) and Industry Task forces have been approved. These will be monitored for execution through respective Implementation Oversight Committees formed for this purpose.

**Bridging the Gender divide in Standards development:** The outreach committee facilitated an online roundtable meeting of select women experts on "Increasing participation of Women experts in standardization activities from India" on 10 March 2023. The objective was to discuss how to engage more women in standards bodies. Information on initiatives being taken by ITU for women to contribute meaningfully in standards meetings was shared with the group. Recommendations made are planned to be taken up with the relevant stakeholders.

**Global Standards Collaboration GSC23:** TSDSI is a member of the Global Standards Collaboration (GSC), a grouping of the world's leading information and communication technologies (ICT) standards bodies, that meets once every 18-24 months to exchange notes on their standardization activities and deliberate on select mutually agreed topics. The 23rd meeting of the GSC was hosted by ETSI in London on 26-27 April 2023. Its theme was "Towards a more sustainable, safer world". TSDSI delegation comprising Mr Suresh Chitturi, Vice Chair - TSDSI, Dr Kaushik Saha (IIT Delhi), Mr N Mohanram, Director General (TSDSI) and Ms Pamela Kumar, (Advisor, TSDSI) joined the meeting and contributed to the discussions. The participating organizations underlined the importance of global collaboration across the entire standardisation lifecycle to develop the best and most secure standards for all, noting that ICT standards impact nearly eight billion people around the world. They agreed on the value of addressing current and emerging challenges effectively as a global community, whenever possible.



## ACTIVITIES

### Pre-Standardization Activities

**DoT-TSDSI Micro Workshop Series on 'Advancing 5G towards 6G' :** TSDSI partnered with DoT to conduct a series of online "Micro-workshops on "Advancing 5G towards 6G" to disseminate information on 3GPP Release 19 technology areas and timelines. This series, conducted under the guidance of TSDSI Roadmap Committee, is intended to primarily mobilize participation and contribution to the ongoing and future work at 3GPP by technical experts and researchers, who are not yet engaged with 3GPP. Following workshops were conducted:

Date	Name	Speakers	Participation	Link for presentations & recordings
13 Jan' 23	#1: Studies related to 'Mobile Network Services'	Dindyal Tosniwal (DoT); Jishnu Aravindakshan (Tejas Networks); Mahesh M.A & Vinay Shrivastava (Reliance Jio); Samar Shailendra (Intel); V J Christopher (WPC)	269	<a href="https://bit.ly/microworkshop1">https://bit.ly/microworkshop1</a>
20 Jan' 23	#2: Studies related to 'Technology and Systems'	Dindyal Tosniwal (DoT); Francesco Pica (Qualcomm); Ki-Dong Lee (LGE); R. R. Mittar (TEC); Samar Shailendra (Intel); Srinivasan Selvaganapathy (Nokia); Xu Yang (Oppo)	250	<a href="https://bit.ly/microworkshop1">https://bit.ly/microworkshop1</a>
27 Jan' 23	#3: Studies related to 'Vertical Applications and Services'	Eric Guttman (Samsung); Niranth Amogh (Huawei); Pallab Gupta (Nokia); Prakash R, (C-DOT); Samar Shailendra (Intel); Y.G.S.C Kishore Babu (DoT)	148	<a href="https://bit.ly/microworkshop3">https://bit.ly/microworkshop3</a>
17 Feb' 23	#4: Studies related to 'Physical Layer Technologies' (in partnership with IIT Kanpur)	Abhishek Kumar Singh, Ajit K Chaturvedi, Ashna Kumari Banka, Jyotirmay Saini, Rohit Buddhiraia, Shyam Vijay Gadhai (IIT Kanpur); Guna B Shekar (TSDSI); Samar Shailendra (Intel)	248	<a href="https://bit.ly/microworkshop4">https://bit.ly/microworkshop4</a>
12 May' 23	#5: Enhancing Security, Efficiency and Performance in Beyond 5G Networks (in partnership with IIT Bangalore)	Amrita Mishra, Debabrata Das, Jyotsna Bapat, Prem Singh, Priyanka Das (IIT Bangalore); Guna B Shekar (TSDSI); Samar Shailendra (Intel)	150+	<a href="https://bit.ly/microworkshop5">https://bit.ly/microworkshop5</a>

### Post-Standardization Activities

Telecommunication Engineering Centre (TEC), DoT adopted TSDSI transposed standards corresponding to 3GPP Rel 17 (<https://tsdsi.in/3gpp/>) as National Standards which relate to 5G.

TSDSI has an agreement with ATSC (<https://www.atsc.org/>) for adoption of their standards. ATSC 3.0 Specifications related to TV Broadcasting were adopted by TSDSI in April 2023. These have been submitted to TEC for adoption as National Standards.

TSDSI submitted transposition references to ITU-R WP5D for update of recommendations on IMT-Advanced (aka 4G) namely M.2012 (Revision 6) and recommendations on IMT-2020 (aka 5G) namely M.2150 (Revision 2) in May 2023.



## GLOBAL STANDARDS ROUNDUP

### ITU

ITU opened its India Area Office and Innovation Center in New Delhi, C-DOT Campus in March 2023.

A Co-creation demonstration session focusing on the current landscape of Digital Health in India was conducted as part of the inauguration activities by the newly opened office. Dr Varinder Garg, Principal Investigator – ICMR-CIBioD, Chandigarh (Officer on Special Duty (OSD) to the hon'ble Union Health Minister and President PGIMER, Govt. of India) represented TSDSI in this session.

This Area office hosted the ITU Regional Innovation Forum for Asia and the Pacific and Co-Creation Demonstration Session on 23rd March 2023. Ms Bindoo Srivastava, Director - MARCOM and Partner Relations (TSDSI) moderated a Panel Discussion on "Open Technology Innovation for SDGs" as part of a Power session entitled "Open Technology Innovation" in the Regional Innovation Forum.

### ITU-R

ITU-R WP5D #43 was held from 31 January to 9 February 2023 in Geneva. A total of 18 Indian delegates registered for the meeting. This was followed by the WP5D #44 meeting that was also held in Geneva from 12-22 June 2023. Seven delegates from TSDSI registered for this meeting. Recommendation on Framework for IMT-2030 and beyond was finalised in this meeting. TSDSI had submitted contributions related to use cases, vision and KPIs for IMT-2030 during towards development of the above said recommendation.

### ITU-T

ITU-T SG20, in its meeting held on 30 January 2023, noted that TSDSI's Software Copyright Policy and Trademarks Guidelines are fully compatible with ITU-T's current policies and guidelines on the same.

A new ITU-T SG20 Regional Group for Asia Pacific (SG20RG-AP) was approved in the SG20 plenary meeting that took place on 8 February 2023. This was based on the contribution from the Ministry of Communication (India), which was supported by TSDSI.

ITU-T Focus Group on Autonomous Networks (FGAN) met during 1- 2 February 2023. A Technical report on Proof of Concepts (PoCs) was agreed to be submitted to the parent group (SG13). This Technical report would contain submissions from all the teams from India including Nokia, University of Kashmir, TCS, and IIT Bhilai. Many of these submissions were a result of local events, workshops and competition rounds hosted by IIT Delhi to bolster quality submissions from the country as part of the India EU Partnership project in collaboration with TSDSI.

Collaboration on ITS Communication Standards (CITS) held its e-meeting on 17 March 2023. Mr Hemant Magadam (Scientist E, CDAC Trivandrum) presented a status report on behalf of TSDSI.

**ITU-T SG5 - EMF, environment, climate action, sustainable digitalization, and circular economy** was held from 13 June 2023 to 23 June 2023 at ETSI headquarters, Sophia Antipolis, France in hybrid mode. It included a Newcomers' session on 14 June 2023 that gave an overview of ITU-T working methods and how to make contributions effectively.



## GLOBAL STANDARDS ROUNDUP



**ITU-T SG9: Meeting of SG - 9** (Broadband cable and TV) was hosted in IISc Bangalore from 9-18 May 2023. A workshop on "The Future of Television for South Asia, Arab and Africa Regions" was organized during this meeting. Ms Pamela Kumar, Advisor, TSDSI moderated the session on "The future television experience". The workshop discussed the future of television for South Asia, Arab and Africa regions, covering regulatory and policy frameworks, emerging and convergent ICT Infrastructures and services, as well as user interfaces and human factors issues. It also provided an opportunity to discuss TV-related regional and international standardization aspects and share best practices and case studies on TV implementations over various media as well as new TV services.

**AI for Good Webinar on "AI – Fuel for the NextGen AR/VR"** was organised on 12 June 2023 by AI for Good, ITU. Prof. Brejesh Lal, IIT Delhi (TSDSI Member) made a presentation on "AI – Fuel for the NextGen AR/VR" here. The webinar was moderated by Mr Vishnu Ram OV, Consultant SGSS TSDSI and Mr. Thomas Basikolo, ITU. Click [here](#) to view the recording.

## 3GPP

**TSDSI organised a workshop on 3GPP Release 19** for the 3GPP IMs and SGN and SGSS members on 8 June 2023 at Bengaluru in conjunction with the SGN and SGSS TP meetings, to create awareness about the release content finalization process and understand the views and preference of individual members (IMs) on new release package. Expert speakers included AK Mittal (TSDSI), Arun Prasath (Samsung), Subhas Mondal (HFCL), Abhijeet Abhimanyu Masal (Nokia), Niranth Amogh (Nokia), Anindya Saha (Tejas). Topics discussed included 3GPP Release 19 content Planning, SA6 Perspective, Energy Efficiency at RAN, RAN Aspects and Energy Efficiency considerations, NR, Interworking of non-3GPP broadcast with 3GPP MBS etc.

Regular transposition of new and updated 3GPP specifications is being carried out. 1974 specifications have been transposed in the reporting period. SGN has further approved 408 transposed specifications from release 13 to 17 as draft standards in TP#31 and subsequent email discussions.



3GPP PCG50/OP49 meetings were held in London on 26-27 April 2023. Mr Adrian Scrase, who served as the Secretary to 3GPP for 30+ years, and would be superannuated in end June, was given a warm sendoff by the members.

**Participation and Contributions by TSDSI IMs in 3GPP Meetings in the reporting period:**

Group	No. of Meetings	No. of Participants	No. of Contributions
RAN	19	560	1120
CT	18	194	1157
SA	33	384	552

## oneM2M



**oneM2M TP 58:** TSDSI hosted the oneM2M 58<sup>th</sup> Technical Plenary in Hybrid mode in New Delhi and online from 20-23 February 2023, with support from the India EU Partnership Project. The TP was attended by 60 delegates from 24 member organizations (in person and remote). The TP included sessions on "oneM2M engagement with Universities" and an orientation for newbies.

TSDSI submitted two liaisons to oneM2M TP 60 for noting its Technical Reports on "Digital Process for Know Your Machine Custodian" (TSDSI TR 6013 V2.0.0) and "Smartphone User Data & Privacy Protection" (TSDSI TR 6012 V1.0.0).

**Participation and Contributions by TSDSI IMs in oneM2M Meetings in the reporting period:**

No. of Meetings	No. of Participants (Organizations)	No. of Contributions
TP 58	24	7
TP 59	17	3
TP 60	7	10

**oneM2M Stakeholders' Day:** oneM2M Stakeholders' Day workshop was organised by TSDSI at the end of the oneM2M TP meetings, on 24 February 2023 in New Delhi, with support from the India EU Partnership Project. The workshop was attended by 48 participants in person and 78 participants in online mode from India and abroad. Participants from India, representing the market, verticals, policymakers, regulatory agencies, startups, interacted closely with the visiting global oneM2M technical experts, and deliberated on India specific requirements, local innovations and solutions. It also had demonstrations by those who have adopted oneM2M for their vertical application/use cases in various sectors.







## GLOBAL STANDARDS ROUNDUP



**3<sup>rd</sup> International oneM2M Hackathon 2023:** ETSI and KETI organised the 3<sup>rd</sup> edition of International oneM2M Hackathon 2023 online from 3 April to 5 June 2023 for promoting oneM2M in the global developers' community. Two teams from India were shortlisted for participating in this edition. The team - "Sustainables" from IIIT-H, India (TSDSI member) received "Best User Application Award", for their project titled "Smart Spaces and Automation."

**oneM2M Global Seminar** - A oneM2M seminar was organised by TTA (Korea) on 13 June 2023 in hybrid mode with the goal of discussing domestic and international oneM2M solution application cases and key issues such as oneM2M and Matter standardization, open source, and certification trends. Mr. Benoygopal E B from CDAC (TSDSI member and oneM2M IM) made a presentation on adoption of oneM2M in ITS domain. Presenters from Europe, Korea and USA showcased domestic and international solutions using oneM2M standards.

**"A Hands-on Workshop on IoT and oneM2M for Smart Cities"** was conducted by IIIT Hyderabad on 18-19 March 2023 under its College Research Affiliate Program. The workshop objective was to train the students and faculty of the affiliated colleges on the topics of IoT, Smart Cities, Plug Load Monitoring, and oneM2M & encouraging them to deploy standard - based solutions in their campuses for energy-efficient smart buildings.



Mr Aurindam Bhattacharya, Vice Chair MARCOM delivered a lecture on oneM2M in the Regional workshop on 'M2M & IoT security & use cases' organized by Mumbai LSA, Department of Telecommunications on 26 May 2023.

## PARTNER ENGAGEMENTS



**Wireless World Research Forum (WWRF)** organised the Huddle 2023 in Singapore on 9-10 May 2023. Mr Girish Ramachandran, Tata Consultancy Services (Member TSDSI) delivered a Presentation on "5G and Sustainable Development" in the Opening Session.

**ETSI MEC#34 Workshop** was held from 26-30 June 2023 at ETSI, Sophia Antipolis in hybrid mode. Prof Arzad Alam Kherani (TSDSI expert, IIT Bhilai) spoke remotely on TSDSI's perspective on 6G and MEC synergies on 29 June 2023. TSDSI's Work Item (WI1-NIP282) on Architecture to support tactile applications with edge intelligence over 5GS evoked keen interest in the workshop.

## PROGRAMS

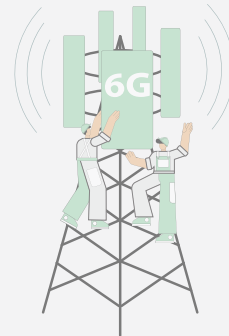


### Standards Driven Research

**Standards Driven Research Workshop @COMSNETS 2023:** TSDSI partnered with COMSNETS to conduct a Standards Driven workshop on 8 January 2023. Shri K Rajaraman, Hon'ble Secretary - Telecom, in his inaugural address to the conference, acknowledged the role played by Indian Research Community through TSDSI in the development of 5Gi and its integration into 3GPP global 5G standard. The workshop had 5 invited talks and 6 research presentations that were shortlisted based on a call for papers.

**SDR@NCC 2023:** The 29<sup>th</sup> edition of NCC 2023 was jointly organized by IIT Guwahati, IIT Patna and IIT Ropar, in IIT Guwahati campus from 23 to 26 February, 2023. TSDSI conducted a Standards Driven Research Workshop on 23 February 2023 in this conference. It had four technical sessions - Cyber-physical system; Sustainability, Trust, Security, and Resilience; Defeat Digital Divide and Ubiquitous Intelligent Mobile Connected Society.





## PROGRAMS



### India-EU Partnership Project (PP) on Cooperation for ICT Related Standardization, Policy and Legislation:

This project was started in end 2016 (after an initial 1 year pilot phase) to promote closer alignment between India and Europe with regard to the production and use of ICT standards, thereby facilitating trade, increasing interoperability and the ease of doing business for companies, and adding additional weight to European and Indian ICT standardization efforts at the global level. TSDSI and ETSI were identified as the Anchor Standards bodies from India and EU for the project.

The project, initially for 3 years duration was extended for a year until February 2021. Thereafter, given its accomplishments, it was further extended, as phase II, for two years till February 2023. The project was instrumental in several collaborative and joint activities between entities from EU and India, including academia, research bodies and startups.

Following permanent resources were created under the aegis of the project – MOOCs on oneM2M, VLC; Technical Reports on upgrading efficacy of LPWAN systems, use of technologies for specially abled people; contributions to ITU-T Focus Group on AI/ML 5G challenges, ITU-T FG on AI & IoT for Digital Agriculture; and capacity building resources in the form of 32 webinars on diverse topics in the project scope areas.

The project was concluded with a closing workshop on 24 February 2023, where project stakeholders and beneficiaries from India and EU discussed their experiences and learnings. The project's role in fostering long-term cooperation between Indian and European entities and promoting global standards adoption in key areas was appreciated unanimously.



## GENERAL UPDATES



### Operational Matters

The following Governing Council and General Body Meetings were held in the reporting period in online mode:

Date	Meeting Name & Number
23 January 2023	GC#41
24 January 2023	GBM#19
31 March 2023	GC#42
9 May 2023	GC#43

The TSDSI Annual Report for FY 2021-22 was released in the GBM#19 meeting. TSDSI budget for FY 2023-24 and the tiered based 3GPP IM Fee structure were approved in Extra Ordinary GC e-Meeting (GC# 42) held on 31 March 2023. The meeting also gave in principle approval for extending the 3GPP IM fees subsidy for Start-ups to MSMEs.

### Outreach

**Session on "Smart Communication Solutions for Smart Utilities and Smart Cities" @ India Smart Utility Week (ISUW) 2023**  
<https://bit.ly/3VhoqGI> - TSDSI, along with DoT and TEC, conducted a session on "Smart Communications for Smart Utilities and Smart Cities" on 1 March 2023 under the India Smart Utility Week (ISUW) 2023 conference, in New Delhi.

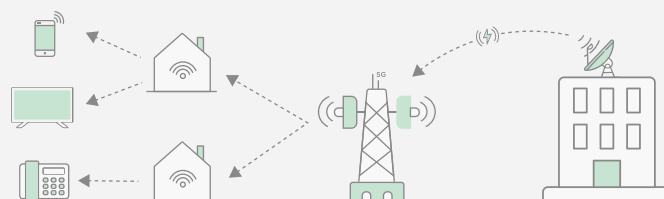
#### Invited Talks:

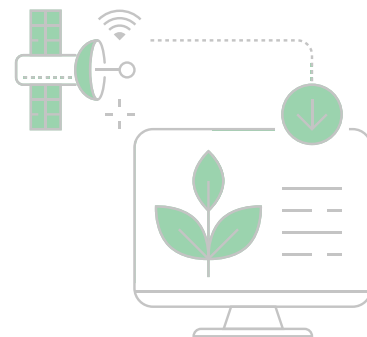
Prof Neelesh Mehta, IISc (Member TSDSI) delivered a keynote and participated in a panel discussion in a Forum on "Multilateral Collaboration on 6G Research in AP Region", organised by the FUTURE MOBILE COMMUNICATION FORUM on 17 March 2023.

Prof Abhay Karandikar (IIT Kanpur), Dr Rajkumar Upadhyay (CDOT), Dr Kumar N Sivarajan (Tejas Networks) and Ms Pamela Kumar (TSDSI)



participated in a Panel Discussion on "India's 6G Ambition: Role of Academia & Industry in Global Standards" in the "5G Congress 2023" conference organised by ET Telecom on 24 March in New Delhi.





## GENERAL UPDATES



Prof Brejesh Lall, TSDSI Member (IIT Delhi) moderated a Panel Discussion on "6G Research & Standardization Roadmaps for Future"



in the 6G India International Conference in New Delhi on 9 May 2023.

Ms Pamela Kumar (Advisor, TSDSI) delivered a keynote address on **"Role of Standards for Socio-economic Development"** in a webinar on "Empowering the Least Developed Countries through ICT" organised by the Institute of Engineers (India) in association with IEEE ComSoc, Bangalore on the occasion of World Telecommunication and Information Society Day on 17 May 2023.

Mr Rahul Vatts, Governing Council Member - TSDSI (AIRTEL) participated in a panel discussion on **"Regulatory & Legal Frameworks in 5G Development: A discussion on developing long term strategies towards success"** in a US-India Workshop on "5G and Next Generation Networks" on 23 May 2023 in New Delhi.

Mr Suresh Chitturi - Vice Chair TSDSI (Samsung Research), Mr R Prakash - Chair SG Networks (CDOT) and Ms Pamela Kumar - Advisor TSDSI, participated in a Panel Discussion on **"6G Standardization" in the National Conference on 6G Spectrum, Technologies and Standardization**, hosted by ITU APT Foundation of India on 19 April 2023 in Bengaluru. The panel was moderated by Mr R K Pathak, DDG- International Cooperation, DoT.

Ms Pamela Kumar- Advisor, TSDSI, participated in a Panel Discussion on **"Pre-Standards Research and Coordination - can a single, unified global 6G standard be achieved?"** at the 6G Global Summit in Manama, Bahrain on 3 May 2023.

If you are interested in conducting a standards development outreach workshop for your organization or your industry segment, please contact [outreach@tsdsi.in](mailto:outreach@tsdsi.in).

## Capacity Building:

An "Introductory session on ITU-R WP5D & 3GPP" for members of TSDSI partner Malaysian Technical Standards Forum Bhd (MTSFB) was conducted on 20 January 2023. Dr Sendil Kumar (Ericsson), Mr Jitendra Singh (Qualcomm) and Mr AK Mittal (TSDSI) delivered the talks.

TSDSI conducted an induction session on "Role of TSDSI" for Mid-Career Training Program for ITS officers with 25 years+ service on 9 February 2023 in person at the NTIPRIT ALT Campus, Ghaziabad.

TSDSI Experts from the Secretariat delivered lectures on TSDSI and 3GPP organizational setup, functions and working to Officer Trainees of ITS2020 batch at NTIPRIT between 3-7 April 2023.

## Thought Leadership:

**An Article on "Evolution of Network Nodes: From IAB to IRS"** by Dr Rohit Budhiraja and Mr Shyam Gadhai from IIT Kanpur (TSDSI Member), was published in 3GPP Newsletter May 2023 Edition. The full article can be viewed at: <https://bit.ly/3W0On0Q>.

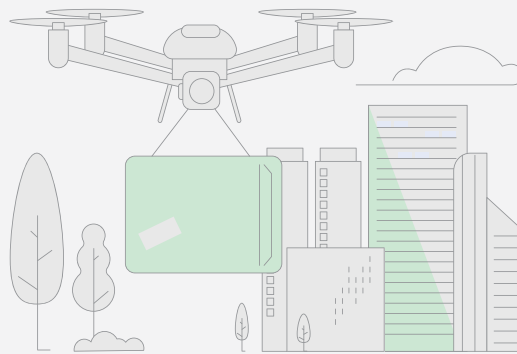
**A paper by Mr Vishnu Ram OV from TSDSI, along with co-authors - Adrian Kliks, Marcin Dryjanski, Leon Wong, Paul Harvey, on "Towards Autonomous Open Radio Access Networks"** was published in ITU Journal on Future and Evolving Technologies, Volume 4, Issue 2, June 2023. The paper can be viewed at: <https://bit.ly/42natY>.

**An article on "Taking the Lead: Scripting India's global journey towards 6G standards"** by Ms Pamela Kumar, Director General, TSDSI, was published in tele.net magazine, January 2023 edition. The full article can be viewed at: <https://bit.ly/422EaQz>.

Please visit <https://tsdsi.in/articles/> to see list of articles published by TSDSI member experts.







## Post-Quantum Cryptography in the 5G Era

**Mr Sabyasachi Mandal, Mr Rakesh Singh Rawat & Mr Prashant Chugh, C-DOT, New Delhi**

Quantum physics describes the behavior of matter and energy at the atomic and subatomic levels, where they can exist in multiple states at once and influence each other over distances. Quantum computers use these phenomena to encode information in quantum bits or qubits, which can be 0, 1, or both at the same time. An important property of Qubits is that their states are linked even when they are separated. This allows quantum computers to process multiple possibilities simultaneously and find solutions that would be too complex for classical computers in logarithmically reduced time durations. However, the same has a highly significant impact on cryptography. Shor's algorithm running on a Cryptanalytically Relevant Quantum Computer (CRQC), exponentially speeds up the computation of the prime factorization problem thereby rendering any algorithm based on the same (such as RSA) unfit for providing cryptographic security. RSA is widely used for secure key exchange and authentication in communication [1].

5G technologies are potentially likely to revolutionize everything around us, from fast internet to drone based last mile delivery, from leveraging AR/VR for our interactions to driverless vehicles. More private data and critical systems will go online in the 5G era, making communication security even more crucial. Cryptographic primitives are critical to providing security to communication channels and quantum computing is a massive threat to it. So, making 5G systems quantum secure is very important [2].

Several areas in the 5G system are vulnerable to quantum computers, such as use of TLS in the control plane which contains several quantum vulnerable cryptographic primitives; and use of Elliptic curve cryptography in identity protection (SUPI/SUCI) on the user-equipment (UE) side. The next obvious step is to come up with ways to provide quantum resistance in these areas.

The solution to the above-mentioned issues is provided by two major techniques of providing quantum resilience to secure systems - Post Quantum Cryptography (PQC) and Quantum Key Distribution (QKD). PQC involves building a cryptography scheme around a hard mathematical problem unaffected by attacks from Quantum computers. QKD involves using quantum-mechanical properties, phenomenon, and components to guarantee the confidentiality of the random keys being distributed by it. PQC is cost-effective to deploy, provably secure and does not require any additional infrastructure. QKD on the other hand needs an entirely specialized infrastructure that would run alongside the existing system that needs to be made secure.

Post-Quantum Cryptography (PQC) has emerged as one of the top solutions to handle threats from quantum computing. It refers to cryptography that needs to remain secure in a scenario where quantum computers are mature enough to make viable practical attacks using Shor's algorithm. It involves techniques based on underlying hard mathematical problems that are believed to be secure from quantum computers such as Lattice problems (e.g., Shortest Vector Problem) and Error-Correcting Code problems (e.g., Difficulty of decoding random linear code). These are referred to as lattice-based and code-based cryptography respectively.

As public-key cryptography (asymmetric cryptography) is most affected by quantum computers, hence multiple efforts to develop quantum-resistant public key algorithms for use in key exchange and signatures are going on. ETSI published a white paper on Quantum Safe Cryptography and Security in 2015. NIST has recently completed the 3rd round of standardization process, selecting four candidate algorithms for standardization, and four more candidates are being evaluated in its 4th round [1].

PQC standardization process as seen presently, is nearing completion with selection of an algorithm (Crystals-Kyber) for standardization. New Standards will be required for secure implementation of PQC algorithms and their protocols. However, migration from traditional cryptographic security to a post quantum security, poses key challenges on the technical as well as policy fronts. A possible solution is to use the hybrid approach for key exchange, which combines a time tested and trusted traditional algorithm (e.g., ECC) alongside a post quantum algorithm which will provide post quantum security.

TSDSI has published a Technical Report on existing security algorithms in 5G Networks based on the released 3GPP standards and potential threats of Quantum Computing to these [2]. It also gives status of technical activities in other SDOs, Industry bodies, development of incremental recommendations and proposals. A proposal to carry out a study for applying the quantum approach to mitigate authentication relay attacks is being discussed in the Services and Solutions Study Group of TSDSI as a New Item Proposal namely, a location privacy-preserving scheme to mitigate the authentication relay attack under False Base Station in 5G – quantum approach.

### Looking ahead:

Quantum computing had not matured enough during the period when requirements of 5G systems were being drawn and hence no provision was made in the 5G standards for quantum resilience. Therefore, any quantum security solution must exist on top of the existing standards, which makes deployment even more challenging. Migration from traditional cryptographic security to a post quantum one is another challenge involving technical and policy issues.

The hybrid approach of using a PQC algorithm alongside a traditional time-tested algorithm remains our best bet.

To prepare India for the Post-Quantum Era, Government of India has launched the National Mission on Quantum Technology and Applications (NM-QTA) which aims to seed, nurture, and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology.







## INVITED ARTICLE



Telecom Engineering Centre (TEC) along with C-DOT and TSDSI recently held the first international Quantum conclave in Delhi, to showcase international and domestic R&D in Quantum technology & products. C-DOT is working on the development of both PQC and QKD products. To promote collaboration amongst industry and academia in PQC, C-DOT, in association with CRSI, hosted the National Workshop on Cryptology (NWC'2022) to showcase the latest cryptography research and bring greater synergy with academia in the development of post-quantum secure products and services.

### References

[1] NIST, "Post Quantum Cryptography CSRC, NIST," 2023. [Online]. Available: <https://csrc.nist.gov/projects/post-quantum-cryptography>

[2] S. Mandal, R. Rawat and P. Chugh, "Study of Post-Quantum Cryptography for Future 5G Networks and Application Verticals (TR 6021)," TSDSI, 2023.



#### Mr Sabyasachi Mandal

Senior Research Engineer, C-DOT

**Bio:** Sabyasachi received Bachelor's and Master's degree in Mathematics and Computing from Indian Institute of Technology, Kharagpur. He is currently a Senior Research Engineer at the Centre for Development of Telematics (C-DOT), New Delhi,

working in the area of cryptography and information security. His research and development interests include cryptography, quantum computing, information security, artificial intelligence, machine learning and network security.



#### Mr Rakesh Singh Rawat

Team Leader, C-DOT

**Bio:** Rakesh Singh Rawat received his B. Tech. degree in Computer Science and Engineering from Harcourt Butler Technological Institute (HBTI), Kanpur in 2000. He has more than 22 years of work-experience in Telecom R&D. He is currently a

Team Leader at the Centre for Development of Telematics (C-DOT), New Delhi, working in the area of cryptography and security solutions. His current technical interests include Device Security, Network Security, Cryptography and Post Quantum Cryptography.



#### Mr Prashant Chugh

Group Leader, C-DOT

**Bio:** Prashant Chugh is currently working as a Group Leader in C-DOT, New Delhi. Prashant has more than 26 years of work-experience in Telecom R&D in C-DOT where over the years he has contributed in several projects. His current work areas are

Post-Quantum-Cryptography and Network Security. Prashant is a senior member of IEEE and has also served as Chair of IEEE Communication Society, Delhi Chapter. Prashant holds a Bachelors in Technology degree in Electronics & Communications from NSUT Delhi (known as DIT earlier) and a Masters in Technology degree in Computer Technology from IIT Delhi.

## ANNOUNCEMENTS



### TSDSI Hall of Fame 2022 Awards

(<https://tsdsi.in/hall-of-fame/>)

The TSDSI Hall of Fame recognises individuals who have contributed to the cause of TSDSI by providing outstanding leadership, making outstanding contributions of technical nature, growing TSDSI as an organization and enhancing the standing of TSDSI in the community.

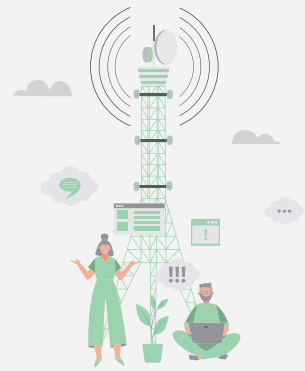
TSDSI Hall of Fame 2022 Awards ceremony was held on 3 March 2023 in New Delhi. Shri K. Rajaraman, Hon'ble Secretary (T) – DoT, Government of India gave away the awards.

Mr Anindya Saha, Chief Technology Officer, Saankhya Labs Pvt. Ltd. was recognised as TSDSI Hall of Fame 2022 FELLOW for Technical Excellence for "pioneering the Standards development for Broadcast-Broadband Convergence, at TSDSI, ITU and 3GPP, establishing India as a global leader; and for shaping the TSDSI Standardization Roadmap 2.0".



Mr Satish Jamadagni, Sr Vice President – Global Standards, Technology Development, Reliance Jio was recognised as TSDSI Hall of Fame 2022 FELLOW for Organization Building for "establishing strong Industry-Academia collaboration and rallying global support for TSDSI driven contributions (for 5G and 6G) at 3GPP & ITU and committed leadership to streamline the technical and governance processes within TSDSI".





## ANNOUNCEMENTS



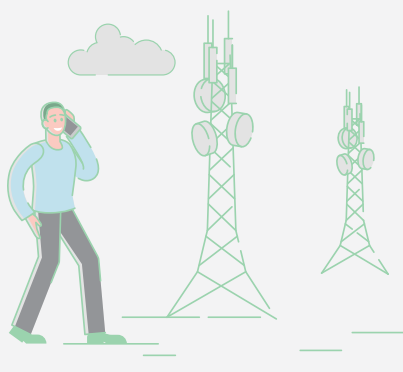
A panel discussion on “Achieving Leadership in Digital Technologies Standardisation” was conducted on the occasion. Ms Pamela Kumar, then Director General moderated the session and Mr D K Agarwal, BSNL, Mr Satish Jamadagni (RJIO), Mr Sanjeev Arora (Vi), Ms M Revathi (WPC), Mr Abdul Kayum (TEC) and Dr Kumar Sivarajan (Tejas Networks) were the expert panelists.



## TSDSI Outstanding Technical Contributions Awards FY 2021-22

(<https://bit.ly/41o5dp9>):

Awardees of the 2<sup>nd</sup> Edition of TSDSI Outstanding Technical Contributions Award FY 2021-22 were felicitated in the TSDSI General Body e-Meeting #19 on 24 January 2023. Shri Ritu Ranjan Mittar, Sr DDG & Head TEC-DoT, Govt. of India gave away the awards virtually to Dr Abhishek Thakur (IDRBT) and Mr Srinivasan Radhakrishnan (Sooktha Consulting Pvt Ltd). These awards recognize the efforts and contributions of individuals in progressing the development of a standard in TSDSI during the year (April through March).



## Secretariat Team

### N Mohanram takes over as Director General:

Mr N Mohanram has taken over the responsibilities of Director General, TSDSI from Ms Pamela Kumar, w.e.f 10 April 2023.

Mr N Mohanram has served as the Director-General of ERNET India, Director and CTO at C-DAC, and CEO of NADL—a Union Government company in the financial sector. He has 34+ years of proven track record in research, technology development, and cyber-secure infrastructure deployment and operations in the domains of high-speed networking, high-performance computing, and financial technologies.



TSDSI thanks Ms Pamela Kumar, for her yeoman service and acknowledges her contributions in establishing a strong foundation for TSDSI, defining the vision and lifecycle for standardization, and mobilizing the Indian eco-system to get actively engaged in standards-driven research and standards contributions as Director-General of TSDSI over the last six years.

Ms Sweta Singh and Mr Sushil Kumar Paswan have joined the Secretariat in the SG-Networks and Finance teams respectively.

### TSDSI mourns the loss of Retd. Major General (Dr) Pritam Bishnoi:

Retd. Major General (Dr) Pritam Bishnoi, who had joined TSDSI as Consultant in the Networks Study Group, passed away on 8th March 2023 after a brief illness.





## ANNOUNCEMENTS



Gen Bishnoi joined TSDSI in August 2021 after a distinguished career spanning 37 years in the Indian Army. During his short stint at TSDSI, he made an indelible mark in the activities of TSDSI - notably, broadcast-broadband convergence, mobilizing participation and contributions in 3GPP, interfacing with NCCS, BIS and Satellite communities.

He will be remembered for his laser sharp focus and military precision in all activities that he undertook at TSDSI.

## TSDSI Tech Deep Dive 2023:



The 6<sup>th</sup> Edition of TSDSI's Flagship conference- TSDSI Tech Deep Dive 2023 will be from 3-6 October 2023. The theme of the conference is "6G Horizons: Converging Technologies for a Connected Society". It will have 6 fully online technical sessions followed by the Conference theme session (to be conducted in hybrid mode in New Delhi) on 6 October. The TSDSI Awards ceremony will also be conducted on 6 October.

Participation in the conference is open to all by prior registration.

Please click here to register: <https://bit.ly/43diT6Z>.

## MEMBERSHIP



TSDSI welcomes the following members who have joined us in the reporting period:

### Corporate Member:

**Dhruva Space:** is a full-stack Space Engineering solutions provider, based in Hyderabad, India. The company is active across Space, Launch and Ground segments, serving Civilian and Defence segments.

**Wipro GE Healthcare Pvt Ltd:** is working on enabling its HealthCare portfolio for 5G. The company plans to contribute to standards in 5G pertaining to healthcare vertical.

### Observer Member:

**Apazuc India Pvt Ltd:** is involved in telecommunication, defense, power and other technology based Business activities and would like to explore engage with TSDSI in the areas of technology testing (notably LTE/5G networks with timing and positioning using NavIC) and network security aspects.

**ESDS Software Solutions Ltd:** would like to contribute in developing standards for Cloud Interoperability and Portability.

**Scytale Alpha Ltd:** is engaged in designing, developing and deploying cutting edge Quantum Secure Indigenous Solutions. The company would like to contribute to development of standards related to Quantum technologies.

**Rebaca Technologies Pvt. Ltd:** is specializes in Telecom and Video streaming domains. Rebaca would like to contribute to the field of 5G Telecom in TSDSI.

**TSDSI member list can be viewed here**

[https://tsdsi.in/present\\_members/](https://tsdsi.in/present_members/).

**To apply for TSDSI membership, please visit**

<https://tsdsi.in/membership/>.



## EVENTS

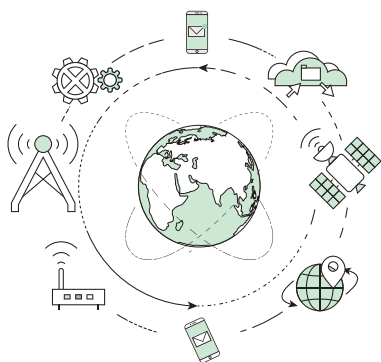


### Upcoming Meetings

Meeting	Date/s
ITU-T SG20 RGAP	25-26 Jul'23
oneM2M TP#61	14-18 Aug'23
TSDSI SGN TP	4-5 Sept'23
3GPP SA/RAN/CT#101	11-15 Sept'23
TSDSI SGSS TP	19-20 Sept'23
oneM2M TP#62	4-9 Dec'23
3GPP SA/RAN/CT#102	11-15 Dec'23

### Upcoming Events

Meeting	Date/s
National Workshop on enhancing Indian Participation in Telecom Global Standards Bodies, New Delhi	7 Jul'23
WTSA 2024 - Awareness Workshop	11 Aug'23
TSDSI Outreach Workshop at 3GPP TSG #101	15 Sep'23
TSDSI TECH DEEP DIVE (TTDD 2023)	6 Oct'23
TSDSI Awards 2023 Ceremony	6 Oct'23
India Mobile Congress 2023	27-29 Oct'23
IEEE ANTS 2023 in MNIT Jaipur (including SDR workshop)	17-20 Dec'23



## ABOUT TSDSI

Telecommunications Standards Development Society, India (TSDSI), aims at developing and promoting India-specific requirements, standardizing solutions for meeting these requirements and contributing these to international standards, contributing to global standardization in the field of telecommunications, maintaining the technical standards and other deliverables of the organization, safe-guarding the related IPR, helping create manufacturing expertise in the country, providing leadership to the developing countries (such as in South Asia, South East Asia, Africa, Middle East, etc.) in terms of their telecommunications-related standardization needs.

TSDSI is recognised by Department of Telecommunications as India's Telecom Standards Development Organisation (SDO).

TSDSI is registered as a Society under the Societies Registration Act (Act XXI of 1860).