



**Telecommunications Standards
Development Society, India**

India's Telecom SDO

Report on TSDSI Drone Communication Services Workshop

Hosted by Telecommunications Standards Development
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1. Background

In September 2018, TSDSI's Study Group for Solutions & Services (SGSS) received a New Item Proposal (NIP) for Drone Communication Services (DCS). After necessary deliberations with the owner and supporters of the NIP, during the Face-to-Face meetings held in December 2018, the SGSS leadership felt the need for larger involvement and representation from Indian ecosystem to understand DCS related requirements and use cases. Accordingly, the idea of conducting a DCS workshop was then conceived. The SGSS members supported the idea and the DCS workshop was thus scheduled on 13th March 2019.

The workshop organizing team represented by the members from TCS, Samsung, Intel, Ericson, Nokia, Tejas Networks, Huawei and TSDSI Secretariat then reached out to various stakeholders for their participation and support to ensure an effective organization and outcome of the workshop. The event thus hosted by C-DOT in Delhi had about 60 participants with presence of more than 20 organizations including DoT, C-DOT, DCPW, CISF, BSF, Army, ISRO, IEEE, Jio, CEWiT, IIT-K, IIT-M, Bot Lab Dynamics, TCS, Tata Sons, Samsung, Intel, Ericson, Nokia, Vodafone, Airtel, Tech Eagle, Punjab University, APINF, ASAT Robo, and TSDSI Secretariat.

This report captures high end summary of the workshop proceedings.

2. Report on the Workshop

Session-1: Inaugural Session

Welcome by the Host.

Welcome by TSDSI DG.

Welcome by TSDSI SGSS Chair and Vice-Chair.

Introduction to the workshop and context setting by the Workshop Co-ordinator.

Session-2: Emerging Drone Use-Cases and Trends in India

We had speakers currently using drones for various services like agriculture as well as some government surveillance purposes. It was brought to notice that there are multiple agencies involved when some trials were to be made. In some cases, more than one Government departments might be needed based on the application/usage of the drone. For example, drone operation for agriculture includes permission from WPC, registration with DGCA and permission from District collector and local Police. In one instance, the paper-copy of the rights to fly misrepresented the purpose for which the application was made. This necessitates single window application for permission to fly, training request for flying drone etc. Further, for agriculture use case standard procedure for spraying pesticides using drones the agriculture ministry or farmer body is not consulted. One of the start-up company also brought out when there are more drones (multiple drone operator) are

permitted to fly within a limited fly-zone, there is a need for standardized way of maintaining inter-drone distance to avoid collision.

The Government Space Agency provided information about the readiness and availability of Indian satellites that are suitable for positioning of drones for imaging and other services.

Session-3: Regulatory Aspects

One of the presenters in the session gave some insights about the regulatory developments in the USA. The speaker informed that the regulatory body evaluated various needs and usages of the communication link from drones. Based on the technical study report of 3GPP, the FAA have concluded that cellular network can be used to communicate with the drones. The USA regulatory body is currently having an open consultation on the necessary regulations for flying drone in beyond visual line of sight (BVLOS) ranges. The USA regulatory body is also considering allowing the flying of drones over human crowd.

One of the speakers from Govt. agency also shared his views on the aspects of reliability & security of the connection and communication links of the connected drone in air. He also raised that it is important have mechanisms for authentication and identification of these drones. He again reiterated that there might be a need for addressing the concern of privacy, especially if drones have live surveillance camera attached during its operation. It was stressed that drone regulations should address safety, security and communications aspects. TSDSI platform to be leveraged for any technical work related to drone communications. Focused interest group in TSDSI with relevant stakeholders in India should bring out the key requirements and challenges for DCS.

Session-4: Global Standard developments and technology around Drone Operations

We had presentations from telecom vendors who presented current developments and support in the 3GPP cellular specifications to support communication with drones in cellular network at various elevation levels. One of the speakers also shared insights from field measurements from a drone connected with an existing LTE based network and flying in certain trajectory. It was informed that when conventional 4G modems are fit to drones for communicating with cellular network, it can cause interference to the network. 3GPP LTE Rel.15 has specified some RAN signalling to allow altitude reporting, as well as location reporting. When UEs with Rel.15 features are used in the drones, the network can manage the measurement reporting, timing advance to minimize interference to current network operations. It was also shown that side-lobes existing LTE network itself are capable for providing radio coverage through side-lobes of existing physically down-tilted base-stations'. A technical report of various simulation and field trials of drone communication with LTE network has been available by 3GPP TR 36.777. Moreover, it was told that 3GPP is currently having few SA requirements for Rel.17.

Session-5: Panel Discussion – Drone Communication and Regulatory Needs

A senior Army officer presented several stories of low-cost drones by anti-social elements like terrorists were shared. Counter Drone challenges to be addressed in case of illegal and illegitimate usage of drones. Robust detection mechanisms in place for illegal and illegitimate usage of drones

A senior DoT official presented summary of the Regulatory provisions in India that exist for Remotely Piloted Aircraft Systems (RPAS) under different categories. Equipment Type Approval (ETA) clearance is mandatory for any Drone regardless of whether imported from outside or locally manufactured. UIN/UAADP approval mandatory through regulator i.e. DGCA. DCS can be enabled with both unlicensed frequency bands and licensed frequency bands

Panel Discussion

The Panel members deliberated on the following aspects.

- Everyone would opt to use drones – how to enable this technology?
- Drone use cases are not always of standalone kind.
- Felt that representation from insurance sector is required.
- LERF 509614?
- Acoustic libraries for drones using AI and ML based analytics may help in addressing the security concerns.

3. Takeaways and Next Steps

Annexure A: Agenda of the workshop

Wednesday, 13th March 2019			
Agenda	Time	Session Title	Duration
	0900 – 0930	Registration	
Session 1	0930 – 1000	Inaugural Session	30 mins
		Introduction of Study Group Services and Architecture aspects, the background for this workshop and kick-off the workshop <ul style="list-style-type: none"> - Welcome by Host - Welcome by TSDSI SGSS Chair - Opening remarks by TSDSI DG Introduction and context setting by SGSS	
Session 2	1000 – 1100	Emerging Drone Use-cases and Trends in India	60 mins
		Presentation from the drone ecosystem players on the prominent use-cases in India Siddesh Nar & Aditya Tiwari - TCS & Tata Manish Saxena - ISRO Tanmay Bunkar - BotLab Dynamics	
	1100 – 1130	Break	30 mins
Session 3	1130 – 1230	Regulatory Aspects	60 mins
		Introduction to regulatory aspects concerning drone operation in India by DGCA representative. To cover aspects (not the complete list) operation zones, communication needs, manual/autonomous modes, other aspects. G Narendra Nath - NSCS Helka-Liina - Ericsson R. Shakya - DoT	
	1230 – 1330	Lunch	60 mins
Session 4	1330 – 1450	Global Standard developments and technology around Drone Operations	80 mins
		Overview by relevant standardization domain experts on drone communication related development Sri Chandra - IEEE Ramakrishnan - Nokia Helka-Liina - Ericsson	
	1450 – 1515	Tea/Coffee Break	
Session 5	1515 – 1600	Panel Session: Drone Communication and Regulatory Needs	45 mins
		A panel consisting of regulators, standards, vendors, operators, ecosystem Panelists Mr Vikram Singh - TechEagle Piyush Mishra (Moderator) - Tata R. Shakya - DOT KK Sood - ISRO Jayant Moghe – Vodafone Col NP Singh – Adg Perspective Planning	
Session 6	1600 – 1630	Outcome of workshop summary and Wrap-up	30 mins

Annexure B: Attendance of the workshop

Name	Organization
Mr. Samar Shailendra	TCS
Mr. Akhilesh Srivastava	TCS
Mr. Mangesh Ingale	Samsung
Mr. Sendil Devar	Ericson
Mr. Punit Rathod	Intel
Ms Pamela Kumar	TSDSI
Mr. Vijay Madan	TSDSI
Mr. A.K Mittal	TSDSI
Mr. Tanmay Bunkar	Botlab Dynamics
Mr V S Panwar	DCPW
Mr. Anurag Vibhuti	TSDSI
Mr. Harsh Kumar	TSDSI
Ms Jayeeta Saha	TSDSI
Ms Vanshika Verma	TSDSI
Mr. Rajesh Vasudev	TSDSI
Mr. Siddesh Nar	TCS
Mr Aditya Tiwari	TCS
Mr. Manish Saxena	ISRO
Mr. Sri Chandra	IEEE
Mr. Ramakrishnan	Nokia
Ms Helka-Liina	Ericson
Mr R Shakya	DOT
Mr. Jayant Moge	Vodafone
Mr Vikram Singh	Tech Eagle
Mr R K SINGH	DCPW
Mr P S SARKAR	CDOT
Dr Sarita Ahlawat	Botlab Dynamics
Mr Narendra Nath	NSCS
Mr Np Singh	Army
Mr Saurabh Dubey	ZIBP
Mr Om Hari	CRPF
Mr Sarbari Chakraborty	TCS
Mr Karthe SJ	TCS
Mr Piyush Mishra	TATA SONS
Mr Rampal	ITBP
Mr Mahesh Singh Kanyal	BSF
Mr NK Mang	CISF
Mr K. Sai Pavantanooj	DeTect Technologies
Mr Ashish Gupta	JIO
Mr M Harsha	CDOT
Mr Dharmensh Kumar	CDOT
Mr Sahil Kalra	CDOT
Dr Subramaniam Saderla	IIT K
Mr Babu DC Verma	Samsung
Mr Devashish Tiwari	CDOT

Mr Abhijeet Masal	CEWit Chennai
Mr Rajesh Patha	ASAT Robo
Mr Abhay Singh Yadav	Tech Eagle
Prof Murthy HSN	IIT-M
Mr Chinmay Bansal	ASAT Robo
Mr Madhur Bhardwaj	Airtel
Mr Kamesh Gupta	TATA Sons
Mr Nitish Mahajan	Punjab University
Mr Sarbjeet Singh	Punjab University
Mr Anurag Agnihori	APINF
Mr Ihita G	Student
Mr Prakash R	CDOT
Mr Srinivasan	NOKIA
Mr Sarat Sahoo	TSDSI
Mr Rohit Rawat	TSDSI