3GPP Compliant MCVideo based Video Conference System for Mission Critical Communication (MCX) Project

1	**Problem Statement**	Development and implementation of 3GPP complaint MCVideo based Mission Critical Communication System. It has to be coherent with existing MCX system (developed by CDOT) and enhance it to use the default and dedicated Bearers created between the C-DOT Core and UE handset. It should be easy to plug it into C-DOT MCX Solution.
2	**Technology Area**	4G/5G Networks, 3GPP standards, SIP Protocol, IMS architecture, Audio/Video codecs, Quality of Service (QoS), Mission Critical Communication(MCX) Systems, Software development tools and frameworks
3	**Project Introduction**	The 3GPP standard based MCVideo solution aims to deliver high-quality, real-time video communication tailored for 4G and 5G mobile networks and use Session Initiation Protocol (SIP) for signaling. The solution will enhance the existing Mission Critical Communications (MCX) system developed by CDOT, ensuring seamless integration and interoperability with it. Leveraging the multimedia communication framework defined by the MCX standards of 3GPP, this solution should support multi-stream capabilities along with recording feature for enhanced collaboration between First Responders and scalability to support multiple simultaneous group video calls. It should be able to accommodate various network conditions and device types. System should have robust quality of service (QoS) mechanisms to ensure a seamless user experience, strong security protocols to protect sensitive information, and interoperability with diverse systems, facilitating effective communication across platforms. The solution should be compatible with the Rx/N5 interfaces, as defined in 3GPP standards for 4G/ 5G networks. This solution is ideal for a wide range of use cases, including enhancing connectivity and collaboration in critical scenarios. By utilizing the advanced capabilities of 4G and 5G networks, the project seeks to empower First Responders with reliable, efficient, and secure video communication tools while maintaining low latency, low bandwidth and storage requirements.
4	**Description**	**Key Features**: • **SIP based MCX Signaling**: Using SIP stack server compatible with MCVideo standards of 3GPP, the solution should facilitate real-time One-To-One or Group audio and video communication among First Responders. • **Scalability**: Each instance of the system shall support • 200 concurrent video group calls, each with up to 10 participants.

		• 1500 concurrent One2One video calls
		The system should have the ability to deploy multiple such instances in Active-Active cluster to meet increasing demands.
		• **Quality of Service (QoS)**: Implement mechanisms to ensure a high-quality video experience even under varying network conditions with very low latency and jitter.
		
		• **Interoperability**: The solution should ensure compatibility with existing C-DOT MCX systems and should seamlessly integrate with it.
		• **Multiple Video Codecs Support**: Support following codecs:
		  • **Audio Codecs**: AMR-WB, AMR-NB, Speex, OPUS, EVS.
		  • **Video Codecs**: H.264, MP4, VP8.
		• **Transcoding Capabilities**: Allow for codec translation to ensure compatibility between different endpoints.
		• **Multiple Video Layouts**: Support various layouts to enhance the visual experience during conferences based on connected users
		• **Video Superimposing**: Ability to add custom captions or logo to video feeds.
		• **Video Recording**: Options for recording meetings for later access and review.
		• **Admin Module**: Integrable with the centralized Admin interface of C-DOT MCX Solution for managing the application, including:
		  • **Reports**: Generation of usage and performance reports.
		  • **Dashboard**: Real-time monitoring of system status and activity.
		
		Compliance and Security:
		• 3GPP Standards: Adhere to the 3GPP guidelines for multimedia communication and meet the requirements as in ETSI TS 122 281 and ETSI TS 124 581 for MCVideo solution, ETSI TS 123 379 and ETSI TS 124 380 for MCPTT , including support for features like Remote/ Local Ambient Viewing, Video PTT, Video Broadcast calls etc.
		• **Encryption**: SSL/TLS for secure signaling and SRTP for encrypted media streams.

5	**Roles & Responsibilities of C-DOT**	C-DOT will provide technical development assistance, and financial support to the project partner(s) selected through a process of evaluation and due diligence conducted by a committee of subject experts. Wherever deemed necessary and depending upon the project type (i.e. co-development or fully outsourced), C-DOT may arrange resources, equipment, training, testing infrastructure, mandatory clearances, statutory permissions, and provide gap funding to the partner(s) in realizing the respective target deliverables. Development costs of the module, whether developed from scratch or derived from existing background technology of partner(s), shall be borne by C-DOT. C-DOT shall use the final solution for integration with production grade software. C-DOT reserves the right to modify and enhance the solution and provide it to C-DOT customers or another Partner(s). C-DOT shall engage with Partner(s) on a non-exclusive basis and shall retain its right to develop similar projects/products through other developmental programs.
6	**Roles & Responsibilities of Partner(s)**	The Partner(s) may build the required module afresh or by modifying pre-existing background technologies available with them. As per the project demand or project type, the Partner(s) may utilize the available test and infrastructure facilities offered by C-DOT with no/some financial implication for its usage. Specialised equipments required for system specific testing and demonstration of solution capabilities, will have to be arranged by the partner(s). It may include devices with specific 4G/5G capabilities or features to measure the load capacity of the server for supporting 200 simultaneous group video conferences with 10 participants each and 1500 concurrent One2One video calls. All commercial proposals shall include necessary cloud infrastructure cost as per requirements, manpower and cost breakup (Capital, Consumables, Travel, DA, Training, Contingency, Overhead, GST etc.). The proposal should include minimum of one years support for enhancements and capacity building for future enhancements in the product. Participation in the project shall be on a non-exclusive basis. All partner(s) shall be required to demonstrate commitment to the project by entering into a formal agreement with C-DOT as per the CCRP policy.
7	**Expected Deliverables**	**System Architecture Document & Design**: Overview of the solution's architecture, components, interfaces, and interactions with other network elements. **Functional Requirements Specification**: Detailed specifications of system functionalities, working and tuning

		Solution Source code: Implemetation of server and client interfaces and steps to scale the system, alongwith the entrire working source code of the solution. **Security Protocols Report**: Overview of implemented security measures and compliance. **Testing Reports**: Results from functional, performance, and security testing. **User Manual and Training Materials**: Guides for users and administrators on system usage. **Deployment Plan**: Strategy for deploying the solution and setup procedures. **Maintenance and Support Plan**: Guidelines for ongoing maintenance and support.
8	**Ownership of Background & Foreground IP**	All technologies created during the project shall be owned by the C-DOT. Any agreement required for collective ownership shall be subsequently settled directly with the concerned partners, but the ownership/IPR of the final solution shall rest with C-DOT only with all the deliverables including complete source code etc.
9	**Timeline for Project**	3 Months from date of approval