ENCQOR 5G

SME Technology Development Program

Anchor Firm	ciena
Challenge Statement	**Digital Reality for Operations and Network Enablement - DRONE**

Challenge Launch Date	January 29, 2020
Challenge Deadline	February 26, 2020
Challenge Statement	5G and Edge Compute promise to unlock the potential of content-rich, real-time interactive and immersive digital reality (VR/AR/MR) applications that will forever transform how we work, collaborate and interact with each other and the environment. As the connected "X" comes on-line, existing 2D operations and management tools cannot keep up with the complexity of multi-layer, multi-domain and multi-dimensional network services and associated data analytics. The Digital Reality for Operations and Network Enablement (DRONE) Project aims to research, design and deliver a holographic network platform based on VR/AR/MR technologies and powered by network intelligence to enable the next generation of Network Operations and Field Services.
Project Partner	Ciena Canada
Timeline	up to 20 months [NOTE: Projects must be completed by March 31, 2022, no extensions will be available beyond this timeline].
Available funding	Up to $500K
Applicant Type	Ontario based SME Scale company
Location	Ontario
Project Details	The advent of Software Defined Networking (SDN), Network Functions Virtualization (NFV) and the increasing use of Cloud Native technologies are enabling network operators to bring much needed agility, flexibility and programmability to their networks. In addition, 5G and IoT technologies are accelerating the level of inter-connectivity across people, things and machines, resulting in very complex dependencies and network life cycle management which existing tools and processes were not designed for. Solution vendors are delivering point solutions to visualize, operate and manage assets within their respective technology domains using traditional 2D technologies that don't lend themselves to real-time shared experiences for planning, engineering, installation, activation, operation and analysis of networks and services. Current systems also do not abstract network complexity from the end user, and presentation methods use complex multi-screen, multi-step processes requiring highly skilled users. Intelligent automation and AI-assisted systems will go a long way in enhancing the operator's experience, but the missing link is a new age engagement platform that leverages Immersive Reality technologies to

	reduce cognitive effort, improve remote collaboration, enhance productivity, eliminate errors and accelerate network life cycle decisions from the field to the front office and back office systems. We envision the Digital Service Provider empowering their end customers, field technicians, operations personnel and partners with mobile 5G AR/MR applications to manage their services as well as build similar applications for other industries. This project aims to answer the following questions and proposes to implement a holographic / 3D framework for visualization, management and analysis of multi-layer networks and equipment: 1. What are the key uses cases with highest pay-off in harnessing the power of holographic network management and tools? 2. What is the architecture for a highly distributed, compute intensive, real-time interactive system to support network operations processes? 3. How do existing AR/MR frameworks adapt to ingest, process and render physical and virtual network models with associated configuration and data analytics – object models and standards? 4. What is a common set of network software services that enable mobile AR/MR network operations and field support? 5. What are the tangible technical benefits, performance metrics and business outcomes in introducing 5G-enabled AR/MR technologies in this space? The Holographic Network Platform (HNP) will be implemented using state-of-the art cloud-native technologies and principles to facilitate rapid prototyping and on-boarding of new applications and easy integration with existing commercial AR/MR frameworks. To demonstrate the value of the platform, three sets of use cases will be considered for the initial “path finder” application development and showcase: **A. Immersive product knowledge and training services** Imagine looking at a product that reveals itself in more natural ways for people to understand its functionality. Collaborative learning without the need for travel and actual physical products to practice how to install, configure and validate product deployment scenarios. This use case transforms technical publication and training design, delivery and self-service content consumption. This capability will enable self-paced learning of new features and capabilities associated with network equipment, software tools and services as well as collaborative hands-on exercises using 3D models of network shelves, circuit packs, optical & electrical pluggable modules, cabling and rack mounting. **B. Remote assistance, maintenance and field tech services**

	Assisting field service personnel with an augmented view of network equipment, connectivity and services as a productivity booster and upskilling effect. Imagine dispatching a field tech to a central office / data center and enabling the use of AR/MR applications and goggles / smart glasses to locate equipment, validate a service order against physical inventory, overlaying status and analytics information on the physical equipment and stepping through the repair and maintenance process without the use of a laptop or paper documentation. This type of service also enables the local tech to initiate an AR call to another tech in another location or operations personnel at the Network Operations Center (NOC). This capability will enable NOC personnel to see and interact with the field of view of the local tech using either a web-based interface for simple annotations and guidance or a set of AR/MR goggles for full 3D remote collaboration. **C. Network insights and analytics visualization** This use case turns traditional 2D visualization in the NOC into a data driven experience for network planning, engineering & migration services; network capacity insights, provisioning & configuration; as well as monitoring, assurance and troubleshooting of Service Provider infrastructure networks. This set of applications extend what is possible from traditional management and operations systems through the use of immersive visualization and interactions with network systems via open APIs. It is expected that the Holographic Network Platform and path finder applications will be deployed on the ENCQOR testbed to validate its capabilities and enable the ENCQOR ecosystem to develop their own immersive network applications. It is anticipated that piloting and commercializing these applications with select network operators that deploy Ciena and multi-vendor network solutions. These applications will be supported on select AR/MR goggles and will be required to be mobile AR friendly as well. As 5G edge infrastructure matures and networks become more in-tune with high intensity application needs (multi-agent, high throughput, ultra-low latency, ultra-resilient), real-time digital reality applications will proliferate across the 5G eco-system and drive a virtuous cycle to scale demand and investment in future 5G networks and services. As a result, the DRONE project is well positioned to attract application developers to the ENCQOR iPaaS to experiment with real-time digital reality use cases that have not been thought of yet.
Project Goals/ Outcomes	This project has 3 key objectives: 1. Understand the value of and produce measurable results in the introduction of AR/MR technology in network and field service operations

	2. Produce a functional Holographic Network Platform that can be deployed and used by the ENCQOR network operations team and well as the user ecosystem 3. Develop 2 leading applications from the uses case described here to enable commercial deployment with Ciena Professional Services and Ciena's customer operations teams. The actual deliverables will consist of: - Project plans and budgeting - Architecture and requirements analysis - Design, implementation, integration of the SME's technology and new artifacts into the platform - Product functionality verification and performance test results - Customer trial plans, support and problem resolution - A commercially available minimum viable product This project will likely lead to new technologies and innovations in the areas of immersive learning and network operations, network automation & analytics visualization, distributed data management, streaming & rendering, as well as the application of AI/ML to enhance extended reality experiences with smart glasses and XR goggle digital assistants. As such, the applicant will be required to develop a plan for the ownership of this intellectual property with Ciena.
Applicant Capabilities	Companies with products, technologies or services in the following areas are encouraged to submit an application: - Telecom network management software, OSS, field operations tools - VR/AR/MR platforms and applications for enterprise space - Deep expertise in 2D/3D model rendering, visualization, meta-data management and digital twin applications - Network modeling, visualization, design and engineering - Cloud-native application development and management - Industrial, engineering, health care, logistics platforms for immersive experiences - Experience with the telecommunications industry, carrier networks operations, field support, site planning and network design with an emphasis on new Software Defined Networks.

Launched in 2018, the ENCQOR 5G SME Technology Development Program partners Ontario based SMEs with ENCQOR 5G Anchor Firms on 5G technology development projects. Areas of research interest are defined by Challenge Statements submitted to OCE by the ENCQOR 5G Anchor Firms and posted to the OCE website on a rolling basis.

If you are interested in developing an expression of interest, please visit the program guidelines for information on next steps.

For any questions about new Challenge Statements or the ENCQOR 5G SME Technology Development Program please contact Jennifer Moles at Jennifer.Moles@oce-ontario.org.