

5G (ENCQOR) Technology Development Challenge Template

Highly Secure Communication Based Train Control Communications using 5G Public Networks

Challenge Launch Date	March 20, 2019
Challenge Deadline	April 17, 2019
Challenge Statement	The deployment of 5G Networks will enable new technologies for transportation systems. Thales Canada is interested in exploring how 5G technologies can be integrated with Communication Based Train Control (CBTC) to enhance existing capabilities and create new capabilities, which should improve the safety, performance and availability of these systems.
Project Partner	<ul style="list-style-type: none">• Thales Canada Inc.
Timeline	<ul style="list-style-type: none">• Project duration is up to 2 years
Available funding	<ul style="list-style-type: none">• Up to \$400,000 CDN
Applicant Type	<ul style="list-style-type: none">• Ontario based SME (small and medium-sized enterprises)
Location	<ul style="list-style-type: none">• the software development of the analytics package can be performed at the SME premises / location• Some meetings and integration activities will be planned at Thales Toronto office, located in Don Mills.• For the field trial of CBTC integration with 5G, a mobile platform will be provided and equipped with advanced CBTC sensors. The mobile platform will be located at the Thales test facility but may be capable of traveling to other sites.
Project Details	<p>A CBTC based transit system is part of a city or region's critical infrastructure and the introduction of 5G technology based improvements must also be accompanied by further enhancements to cyber-security, diagnostics and data analytics in order to manage The potential risks when many more devices become connected to the network and technologies that have traditionally run on closed private networks leverage new capabilities on public 5G networks.</p> <p>Thales will work with the successful SME applicant to;</p> <ul style="list-style-type: none">• Integrate Thales technology for Next Generation Communication Based Train Control with 5G networks.• Create a digital twin of existing train sensor technology to monitor their performance in real time

	<ul style="list-style-type: none"> • Study the performance needs of the new sensors, data storage and process and 5G network performance to compute the sizing / capacity when scaled to a typical revenue system (data storage and processing capacity) • Create a data analytics package for use in the CBTC to monitor system performance and demonstrate successful integration of all elements <p>As part of the proposed project a mobile platform will be equipped with the CBTC train sensors such as camera, lidar, radar and will stream information over the ENCQOE 5G radio system to a central (perhaps cloud based) storage and processing computer.</p> <p>An approach to tagging and classification of the data shall be developed based on the needs and the use cases of the CBTC system.</p> <p>An analytics package shall be developed to correlate and assess the performance of the various sensors according to the CBTC system use cases. The use cases shall be jointly defined between Thales and the SME.</p> <p>Using a computer to simulate additional sensor data, the performance of the 5G network shall be exercised in order to characterize the latency and capacity. The performance of the network under load shall also be an input to the analytics algorithm.</p> <p>The project will culminate in an advanced diagnostics and analytics package that will support the introduction of a next generation of Communication Based Train Control using the capabilities of 5G communication.</p>
<p>Project Goals/ Outcomes</p>	<ul style="list-style-type: none"> • An advanced analytics package that can be utilized for proving the next generation train control system • A working prototype / architecture for a ‘digital twin’ on each CBTC advanced sensor. This would be an MVP for a future package to be delivered with a CBTC Train Control system • Measurement of the performance and capabilities of the 5G network for the purposes of Communications Based Train Control
<p>Applicant Capabilities</p>	<ul style="list-style-type: none"> • Experience in networks and data analytics, correlation and presentation through an HMI. • Big Data and advanced analytics using AI technologies
<p>Additional Information</p>	<ul style="list-style-type: none"> • It should be noted that Thales CBTC system, interfaces and protocols are proprietary and either patented or trade secrets. SMEs applicants

	must be willing to enter into a Non Disclosure Agreement with Thales at the full application stage.
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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 Sarah Fairlie at sarah.fairlie@oce-ontario.org