

# Imagining Canada's Digital Twin

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*Imagining Canada's Digital Twin (ICDT)* is an exploration of the idea of a digital twin (DT) for Canada.

## *What is a digital twin?*

A digital twin is an ecosystem of multi-dimensional and interoperable subsystems. Digital Built Britain defines a digital twin as “...a realistic digital representation of assets, processes or systems in the built or natural environment...that adds social and economic value by augmenting the decision-making process.”<sup>1</sup>

## *What is Imagining Canada's Digital Twin?*

ICDT will be the first national initiative to address the opportunities, challenges, and responsibilities involved in developing a DT at a national scale in Canada. Our goal is not to resolve the question of a DT for Canada, but to determine the plausibility of the concept, the level of effort required to see it realized, and to establish a national group that is poised to move forward in that realization.

## *How will we imagine Canada's digital twin?*

ICDT proposes a national, inclusive, and multidisciplinary research consortium for the creation of a technical, cultural, and ethical framework for building Canada's digital twin. We see this initiative as a necessary next step in placing Canada at the vanguard of the digital economy. The scope for this initial phase of research will focus on a DT of the built environment, concentrating on the Architecture, Engineering, Construction, and Owner Operator (AECOO) industry.

This initial, 2-year project is funded by the New Frontiers in Research Fund (NFRF) Exploration program and has two objectives:

**Objective 1:** Build a research consortium comprised of academic, indigenous, not-for-profit, public, and private partners that represent local and regional networks.

**Objective 2:** Develop a DT prototype of the Montréal-Ottawa-Toronto corridor using a simulated, distributed server network.

Our research through the consortium and the prototyping exercise will support an application for a second phase of funding to the NFRF Transformation program. If successful, these resources would finance the creation of a comprehensive national digital twin – addressing multisector and national concerns.

## *Why are we imagining Canada's digital twin?*

ICDT is an opportunity to develop a leadership role for Canada's AECOO industry in the integration of innovative digital technologies. In Canada, buildings account for approximately 53% of the total energy use and 35% of GHG emissions. However, they also contribute to about 15% of Canada's GDP—making the AECOO industry a formidable economic driver.<sup>2</sup> As proven through applications in the aerospace industry, DT technology has the ability to improve and optimize the entire lifecycle (design, construction, operation, and management) of the built environment. Exploring this potential could provide tremendous value to the AECOO industry and beyond.

Our goal is to augment current research paradigms and disrupt conventional modes of thinking by bridging gaps between disciplines and sectors. We believe that through interdisciplinary research, our combined strengths of our individual expertise will enable ground-breaking advancement in the radically new concept of a national digital twin.

*We invite you join us in Imagining Canada's Digital Twin.*

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<sup>1</sup> <https://www.cdbb.cam.ac.uk/>

<sup>2</sup> <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=HB&sector=aaa&juris=ca&m=2>