

National Master Specifications for Smart Building Ready Systems

CATEGORY F - SPECIAL PROJECTS





Project Summary

To remain relevant and useful, Canada's most comprehensive master specification for construction projects, the National Master Specification (NMS), is updated regularly. As subject matter experts in Smart Buildings, Stantec was engaged by the National Research Council Canada (NRC) to develop new content targeting the procurement of smart building-ready infrastructure in new construction, major renovations, and building technology upgrades.

Project Highlights

Q1 INNOVATION

The purpose of the assignment was to develop a new framework and content for the Canadian National Master Construction Specification (NMS) for Smart Building Systems that will target the procurement of smart building-ready infrastructure in new construction, major renovation projects and building technology upgrade projects.

Why? Smart Building Readiness refers to a building's systems that are designed, built and commissioned so they can seamlessly integrate onto a common automation platform to enable smart building functionalities. Despite the interest in innovative smart buildings and intelligent systems in recent years, the smart intelligence of a building and how the various smart intelligence systems shall be installed, connected and integrated to achieve or increase it have not been definitively defined.

Defining an innovative smart building is highly dependent on the owner, their objectives, the type of facility and its operation. The specifications and framework we established meet the following fundamental principles:

- Optimize the operation, cost and performance of the building and its processes
- Reduce energy use and greenhouse gas emissions
- Integrate readily available data and infrastructure to perform optimization
- Promote interoperability of systems
- Enhance users' comfort, safety and productivity
- Provide analytics and diagnostics tools to monitor the building operation
- Perform improvements on a continual basis

Through this project, we helped resolve the industry consistency, clarified definitions and communication about intelligent buildings, and established a technical specification framework for the design, installation, and commissioning of smart buildings systems in the Canadian National Master Construction Specification (NMS) format. Each of the new specification sections is developed in a way that could be easily adopted and be utilized for specific project application. These new smart building sections are intended for use by the Canadian governments, public crown organizations and private commercial sectors in the preparation of construction and renovation contract documents.



Q2 COMPLEXITY

Over fifteen technical discussions were conducted to define 'proper product or standard', and we considered new and emerging technologies that are not yet well-known, proven or documented by collaborating with the product engineering teams and performing demo evaluations.

We also reviewed industry whitepapers and consolidated the most relevant information, writing the output specifications to ensure Return on Investment for the client.

INTELLIGENT TRACKING PROGRAM

Utilizes bluetooth beacons to track devices.

Easily trace and recover any asset, increase productivity and reduce labour waste, optimize asset pool.

INTELLIGENT EVACUATION PROGRAM

Utilizes sensors to monitor crowd formations and guides people through alternative exits if required.

Shorten evacuation time and streamline the process, provide safer working environment and peace of mind to building occupants.





INTELLIGENT ENERGY MANAGEMENT

Collects and analyzes energy consumption data building-wise, process-wise and equipment-wise.

Gain full visibility into energy usage down to device level, reduce energy consumptions and cut costs, proactively identify building equipment that needs servicing.

INTELLIGENT ELEVATOR MANAGEMENT

Remotely monitors multiple elevator operations & maintenance across multiple buildings. Tracks physical condition, utilization and ride comfort. Detects cargo trolley in the passenger elevator lobby.

Achieve operational and maintenance transparency, minimize life downtime, increase passenger safety, save costs with predictive maintenance.

INTELLIGENT PARKING MANAGEMENT

Utilizes cameras and floor sensors for real-time car park occupancy status, trends and historical reports. Detects long-parked cars and sends alerts to security guard.

Optimize parking space utilization, shorten search time for available parking lots during peak hours and increase safety by preventing parking in restricted areas.



Q3 SOCIAL AND/OR ECONOMIC BENEFITS

By providing an official industry framework, resource tool and reference documents for the emerging smart intelligent building system industry, we endeavoured to provide building owners with the necessary information and in-depth understanding of how their building works. We developed nine new sections for the NMS that aim to reduce or eliminate the challenges associated with the deployment of smart systems: the building systems will be more efficient and effective, responsive to the needs of occupants as well as external needs, and promote environmentally responsible practices.

In large organizations and offices that have introduced flexible or hot-desking work practices, this understanding will result in a better employee experience, improved productivity and cost savings, offering a clear return of investment for the owner.

As an example, modern buildings are serviced by a wide variety of building sub-systems (e.g., building management systems, lighting systems, fire safety systems, security systems, heat ventilation and air conditioning systems, etc.) that facilitate the operation of the building and support occupant comfort and safety. Inexpensive sensors can make the collection of data more economical and innovations in communication technologies have facilitated greater flows of data within buildings that then can be used to inform how buildings are automated. Beyond the buildings themselves, innovations in the Smart Cities space, and within the energy and water sector, have increased the potential integration of buildings into these larger components of the energy transition and fourth industrial revolution.



Q4 ENVIRONMENTAL BENEFITS

Traditionally, buildings have been understood as sources of demand by energy system operators. However, controlled and coordinated building energy systems have the potential to act as resources to the broader energy systems and, increasingly, buildings are being integrated with innovative energy resources such as solar photovoltaics (PV) or combined heat and power (CHP) systems, energy storage technologies, backup generation, and electric vehicle charging infrastructure.

The standardization of smart building technology can have a positive impact on the wider environment by reducing energy usage while enhancing efficiency. Smart intelligent motion sensors and smart power current sensors can be employed in controlling entire building systems with great success and influence on energy use. They can be used to switch off devices when not in use; manage heating and lighting depending on occupancy, or measure real-time energy consumption at a circuit, zone or machine level. They can also help identify areas of high energy use and potential waste.

By defining industry standards for intelligent smart systems, the project helps:

- Reduce energy consumption
- Improve building efficiency
- Establish predictive maintenance
- Increase productivity
- Promote a better use of resources

Q5 MEETING CLIENT'S NEEDS

Intelligent buildings are an evolving and complex sector. Through the regular review and update of the established industry standards, the NRC seeks to stay relevant and current for the benefit of the construction industry. Stantec helped establish an industry standard and create a framework for the deployment of smart building systems. To meet project goals, we performed:

- Extensive research related to technology and procurement of Smart Building systems in North America, Europe and Asia;
- Led technical discussions with the smart building industry and building automation industry;
- Identified proper products, standards, construction practices and project administration activities that help achieve smart building principles;
- Developed the new NMS specification content so they can be prescribed in formal construction contracts and applied on construction projects.

The framework compiles the typical technical requirements and design attributes that should be considered when specifying smart building systems and highlights some of the engineering consultant's activities related to the selection of performance/design criteria during the design process and when preparing construction documents.

This project was successful in identifying technical requirements and guiding principles for specifying smart building infrastructure to ensure a standardized smart building approach is deployed consistently on construction projects.

