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## HABITABILITY AND THE QUALITY OF LIFE IN THE NEXT GENERATION OF WARSHIP

By Lieutenant-Commander Dale Armstrong

### JCSP 47

#### Solo Flight

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SOLO FLIGHT

**HABITABILITY AND THE QUALITY OF LIFE IN  
THE NEXT GENERATION OF WARSHIP**

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## Habitability and the Quality of Life in the Next Generation of Warship

### INTRODUCTION

The first of the Halifax-class ships was commissioned the 29<sup>th</sup> of June, 1992, nearly 30 years ago.<sup>1</sup> HMCS *Halifax* and the 11 ships of the same class are the Royal Canadian Navy's (RCN) latest generation of a major warship. In 2010, the Government of Canada implemented the National Shipbuilding Strategy (NSS) to, among other things, replace Canada's ageing Fleet of major warships. The first of the future Canadian Surface Combatant (CSC) is scheduled to be delivered by the early 2030s.<sup>2</sup> Upon reflection on the many features of ship design and functionality that were implemented wrong when transitioning to the Halifax-class of ship, the senior leadership of the Navy was seized with an imperative to ensure that there is an improvement in all aspects of the new class of warship, and that the Navy is not just taking organizational frameworks of the Halifax-class ship and applying them to the CSC. In support of this imperative, the Director General Future Ship Capability (DGFSC) directed a Working Group to determine what aspects of habitability and the quality of life onboard a warship were important to a junior sailor. The purpose for this effort was to develop a coherent view on shipboard habitability that is reflective of the desires of the RCN's junior sailors. That view was then assessed against BAE Systems proposed design for the CSC to characterize the strengths and improvements inherent to the design, and to find those flaws that would be prove to be egregious.

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<sup>1</sup> Government of Canada, "HMCS Halifax", last modified [or accessed] 26 April 2021, <https://www.canada.ca/content/dam/themes/defence/caf/militaryhistory/dhh/documents/lineages/halifax.pdf>

<sup>2</sup> Government of Canada, "Canadian Surface Combatant: Project summary", last modified [or accessed] 20 April 2021, <https://www.canada.ca/en/department-national-defence/services/procurement/canadian-surface-combatant.html>

The soldiers, sailors, airwomen and airmen are identified as the most valuable part of Canada's national defence, and are key to the Canadian Armed Forces (CAF) mission success.<sup>3</sup> Personnel recruitment and retention is an ongoing problem for the RCN as it embarks on an ambitious three decade long procurement program that will see the Fleet grow by over 50%. Sailor shortages could prove disastrous to the Navy's operational effectiveness with Commodore Steve Waddell, Director General of Naval Strategic Readiness (DGNSR), stating that "the navy's personnel shortages could threaten the Trudeau government's "ambitious" defence policy."<sup>4</sup> Based on the importance of personnel recruitment and retention to the future of the Navy, how can the RCN shape its design choices in the future CSC in order to have a positive effect to maximize junior sailor contentment and comfort so that the ship design is not adversely impacting recruitment and retention? The RCN must ensure that the design elements for the Canadian Surface Combatant habitability spaces are adaptable and innovative in order to ensure that sailors fighting, working and living in are content with both the habitability and quality of life in a ship. Failing to become adaptive and innovative will only exasperate the personnel shortage issues by forcing sailors to live in a home that is not reflective of their lifestyle ashore, and therefore giving more reason, chance and opportunity for losing them as a member of the fighting force. This will impact the operational effectiveness of the RCN.

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<sup>3</sup> Canada. Department of National Defence, B-GL-005-100/FP-001, CFJP 1.0 - Military Personnel Management Doctrine, Ottawa, ON: Chief of the Defence Staff, June 2008. Pg 1-1.

<sup>4</sup> Lee Berthiaume, "Sailor shortage causing headaches for Royal Canadian Navy", *CTV News*, 14 February 2019, last modified [or accessed] 26 April 2021, <https://atlantic.ctvnews.ca/sailor-shortage-causing-headaches-for-royal-canadian-navy-1.4296703>

Generation Z is an emerging definition for people born between the mid-1990s and 2010.<sup>5</sup> It is the generation born after Millennials and is even more comfortable with new technologies owing to the fact that they have inhabited an internet connected environment from birth. It is also the generation that will comprise that largest percentage of the crew of a CSC once they are operational. Research on Generation Z is still in its infancy, with a far greater amount of academic literature on Millennials, their habits, trends and desires in the workplace. Therefore this paper will reference academic works on Millennials, with the understanding that the Generation Z may have its own amplification on different trends.

### **THE RCN'S HABITABILITY WORKING GROUP**

In February and March of 2020, a survey was devised and made available to the public to garner an understanding of what sailors want, like and what they detest about the quality of life amenities in a warship. The point of the survey was to garner data upon the general perceptions in the areas of bunking, storage, fitness, rest and relaxation areas, digitization, and privacy. The survey was conceived, designed, developed and distributed by the RCN's Habitability Working Group. The Working Group was made up of a small and diverse cohort of serving young officer and non-commissioned members with different gender identities, sexual orientation, races, backgrounds, trades and sailing experience. The survey proved to be a success as it garnered nearly 3000 respondents with 69% of them being categorized as Millennials.<sup>6</sup> The data gathered from the survey

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<sup>5</sup> Michael Dimock, "Defining generations: Where Millennials end and Generation Z begins", *Pew Research Center*, last modified [or accessed] 25 April 2021, <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>

<sup>6</sup> Samuel Mercier, "Habitability Report", Royal Canadian Navy Habitability Working Group, Canadian Armed Forces, 2020, 6.

respondents was also analyzed by the same members of the Working Group and the results were compared against BAE's proposed design in order to determine what the design is getting right, and where it is failing. Throughout the survey, across a large variety of respondents, the themes of privacy, convenience and fitness were the most prevalent.

### **Privacy**

Privacy proved to be one of the most prevalent themes that emerged from the analysis of the survey data.<sup>7</sup> It is feature prominently in the survey data whenever there was an opportunity for respondents add comments at the end of survey questions. The desire for privacy extended to private communications home, privacy in the heads and washplaces, and privacy whilst changing. Also prominent was a concern of the level of privacy within individual bunks. How does the desire for privacy link to academic papers on millennial workplace preference given that a standard civilian workplace does not require a 24 hour presence and the sense of duty that is inherent to a ship's six month deployment? First of all, the largest group of respondents to the survey were Millennials<sup>8</sup>, allowing for some similarities to be drawn between the survey data and academic reports based on empirical data. Secondly, though issues of privacy are not discussed in academic papers on Millennial integration into the workplace, a concept of privacy as it is presented in the CSC Habitability Report, the survey questions, and respondents written answers can be associated through analysis to be a different representation of a desire for work-life balance. Many academic papers prominently highlight the

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<sup>7</sup> Mercier, Annex A.

<sup>8</sup> Mercier, 6

importance of balanced work-life career as one of the defining characteristics of how Millennials view their jobs, and what is important to them and their careers.<sup>910</sup> In order to develop a work-life balance on board a ship, sailors must have the opportunity to seek out private spaces or activities in order to detach from the ever present functionality and their shipmates while in a ship at sea. Though the privacy may be artificially constructed and largely based on a sailor's perception, the desire for privacy is clear in both the survey data of the CSC Habitability report and within academic writings which espouse the importance of work-life balance to Millennials.

Failing to be innovative in the design of the habitability spaces, the RCN will create living areas for sailors to inhabit that do not offer even a modicum of privacy or even the illusion of privacy. If the original BAE lounge designs were to be accepted for the junior ranks habitability spaces, there is an increased chance of dissatisfaction amongst the crew on the quality of their life onboard a ship and therefore a correlation to contributing to the retention problem in the Navy. The Type 26<sup>11</sup> junior ranks lounges feature only a single U-shaped couch, which is fitted to the deck, resulting in sailors trying to relax during their off-watch time by being crammed into this archaic designed couch, side-by-side, with nothing to look at but each other or else their personal electronic media devices. The Navy needs to be more creative with their design choices for the habitability spaces allowing for both a modular design that permits easy

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<sup>9</sup> Sally Carless, Josephine Wintle, "Applicant Attraction: the role of recruiter function, work-life balance policies and career salience", *International Journal of Selection and Assessment*, Vol. 15 Issue 4. (December 2007), Pg 395

<sup>10</sup> Karen Myers, and Kamyab Sadaghiani, "Millennials in the Workplace: A Communication Perspective on Millennials' Organizational Relationships and Performance", *Journal of Business and Psychology*, Vol. 25, Iss 2. (New York, June 2010) Pg 228

<sup>11</sup> The Royal Navy's Type 26 is the base design for the CSC

modification and presents a sense of privacy by having multiple group areas cleverly set into restrictive space.

### The Technical Solution

Through an analysis of the BAE proposed design for the CSC, there are many aspects that greatly increase the level of privacy afforded a sailor while sailing and there are some design aspects that will not work. One promising design change inherent to BAE's proposed design is the move away from communal heads and washplaces to individual, private and securable heads and washplaces. This change will greatly increase a sailor's sense of privacy while living in the ship and can be perceived as a positive improvement over the existing ships' configuration. From the survey data, privacy ranked as the top priority when considering the heads and washplaces.<sup>12</sup> Privacy also was recognized as a high priority when considering living spaces.<sup>13</sup> A dramatic design change that would modernize the mess decks would be the use of sleeping pods. A more affordable innovative design change is to use materials and design methods to ensure that there is the ability to ensure no light ingress into a sailor's bunk while the curtains are closed. One positive aspect of the BAE design is that mess occupancy is capped at 9 personnel per space vice over 30 in some legacy ships' mess decks. Finally, there is an opportunity to repurpose a dated design requirement and add a novel capability for private personnel communication. The ship's library is part of the CSC proposed design. Given that much of the media and books used by Millennials is digital, the designated library space could be designed to be three or four individual private communications

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<sup>12</sup> Mercier, 16

<sup>13</sup> Mercier, 13

Pods with both video and voice communication options available. In contrast to legacy ships, this arrangement would afford much more privacy than standing in a common area or thoroughfare to call home.

## **Convenience**

Both Millennials and subsequently members of Generation Z have grown up within a digital world. “Millennials are the first generation to have been born into households with computers and to have grown up surrounded by digital media.”<sup>14</sup> Members of Generation Z push the requirements for digital integration even further with a survey showing 68% of the Generation Z respondents describing themselves as “very confident in the tech skills...[and] 75% of respondents, according to the Deloitte study, demand[ing] the latest technology in the workplace.”<sup>15</sup> It is for these reasons that the RCN needs to ensure that the Future Fleet has the systems built into their design to enable the vast varieties of methods of communication. The data from the CSC Habitability Survey indicates a desire and expectation for the RCN to continue its “effort to modernize the way [the RCN does] business.”<sup>16</sup> The majority of survey respondents indicated that their quality of life onboard would improve with a more integrated and digitized system to support both an operational effect and personal time. The survey data also showed that sailors desire to have a digital connection with loved ones. They desire a digitized method of information distribution to access information and remain up to date.

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<sup>14</sup> Myers, 231

<sup>15</sup> Felix Beilharz, “Generation Z: Seven Facts Companies Should Know About Digital Natives”, *Forbes*, 7 April 2021, last modified [or accessed] 1 May 2021, <https://www.forbes.com/sites/forbescoachescouncil/2021/04/07/generation-z-seven-facts-companies-should-know-about-digital-natives/?sh=e092b3e64324>

<sup>16</sup> Mercier, 9

The future fleet will need to be digitized in order to meet the work and social needs of sailors. The Navy identified the importance of mobile and digitized networks in its Digital Navy Strategy.

**Mobile** technologies include smart phones, tablets and other portable devices that can be used to improve the connectivity sailors have with their families while deployed, or to augment the way that work is conducted at sea or ashore. Combined with the effective use of cloud-based computing capabilities, mobile devices offer significant potential to empower members of the naval team regardless of where they work.<sup>17</sup>

### **The Technical Solution**

The RCN needs to ensure that when the first CSC is commissioned it is truly a cutting-edge digital warship of the future. Given the demographic of the Generation Z in relation to technology literacy, designers should not be limited by fears of making the ship too technological advance that it would be beyond the understanding of sailors of how to use the advanced technology. A mobile application that communicates coordinating information pertinent to the internal operation of a ship would greatly enhance communication within teams and between departments. Movies and television shows should no longer be through the loaning of DVDs, and there is the potential for a ship wide digital entertainment network that needs to be accessible via personal devices. Training is also another area that can be a method to present the RCN as an advanced and

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<sup>17</sup> Canada. Royal Canadian Navy. *Digital Navy: A Strategy to Enable Canada's Naval Team for the Digital Age*. (DND: 2020). 16

digitally competent organization. Novel method of instruction should be adopted. For example, rather than a 45 minute power point presentation on how to change a circuit board for a radar, the technology exists to offer the instruction either through virtual reality (VR) or augmented reality (AR). Additionally, integrated AR into ship's maintenance routines would increase productivity, automatically digitize the work done and schedule updates, and offer a real-time guide of the work that needs to be completed. The advanced digitization of both personal and work interactions is expected and a requirement to meet the work and social needs of the RCN's future sailors.

### **Fitness**

As the Working Group was developing the survey questions, fitness was identified early on as a key aspect of habitability and quality-of-life for sailors. The survey data demonstrated that the Working Group's perception was right, with a majority of respondents placing a strong emphasis for the requirement of adequate fitness facilities in the CSC design. "This aligns with both the values of the CAF and the overall trends in society where people are putting a higher emphasis on the importance of physical fitness and maintaining healthy lifestyles."<sup>18</sup> The proposed CSC design presents a decrease in the overall square footage of the fitness area from the most modern iteration of the Halifax-class of ship and its retrofitted fitness spaces.<sup>19</sup> Another identified issue is that the types of fitness options envisioned for these CSC purpose built fitness areas is not broad enough to meet the diversity aspirations of the RCN. Essentially the fitted fitness equipment and spaces will be appropriate for young males to workout in, however there

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<sup>18</sup> Mercier, 10

<sup>19</sup> Mercier, Annex C

are no options for a more diverse fitness regime which can be expected to accompany a more diverse force membership.

### The Technical Solution

Based on the fitness habits of today's sailors on legacy ships, there is a trend towards more fitness capability, diversity and opportunity. Consideration for innovative design changes to create a multi-purpose fitness space will offer a greater appeal to a more diverse portion of the RCN's future sailors. Fitted capability to conduct some fitness activities outside on the upper decks should also be considered. Finally, more deck space must be allocated to fitness in order to meet the increasing demand for fitness that the sailors have demonstrated in the survey data.

### CONCLUSION

By 2030, the first of class CSC will be crewed by a mixture of a few Millennials and mostly members of Generation Z. They hold an expectation of a fair work-life balance, a technological advanced workplace, and opportunities to support their mental and physical health through fitness. These themes are prevalent throughout the CSC Habitability Report and associated survey data in the form of privacy, convenience and fitness. By ensuring the CSC design has those opportunities to escape to some privacy, communicate and access information effortlessly, and maintain a reasonable fitness routine; the designer will be contributing to the operational effectiveness of the RCN from now until 2040 by creating a platform that sailors are eager to deploy on. It is by ensuring that sailors are not repulsed by life in a warship, the RCN will maintain a

capable fighting force in order to carry out whatever mission the Government of Canada gives them.

## BIBLIOGRAPHY

- Beilharz, Felix. “Generation Z: Seven Facts Companies Should Know About Digital Natives”. *Forbes*. 7 April 2021. Last modified [or accessed] 1 May 2021. <https://www.forbes.com/sites/forbescoachescouncil/2021/04/07/generation-z-seven-facts-companies-should-know-about-digital-natives/?sh=e092b3e64324>
- Berthiaume, Lee. “Sailor shortage causing headaches for Royal Canadian Navy”. *CTV News*. 14 February 2019. Last modified [or accessed] 26 April 2021. <https://atlantic.ctvnews.ca/sailor-shortage-causing-headaches-for-royal-canadian-navy-1.4296703>
- Canada. Royal Canadian Navy. “Digital Navy: A Strategy to Enable Canada's Naval Team for the Digital Age”. (DND: 2020). [http://www.navy-marine.forces.gc.ca/assets/NAVY\\_Internet/docs/en/innovation/rcn-digital-navy-initiative\\_v2.pdf](http://www.navy-marine.forces.gc.ca/assets/NAVY_Internet/docs/en/innovation/rcn-digital-navy-initiative_v2.pdf)
- Canada. Department of National Defence. B-GL-005-100/FP-001, CFJP 1.0 - Military Personnel Management Doctrine. Ottawa, ON: Chief of the Defence Staff, June 2008. Pg 1-1.
- Carless, Sally, Josephine Wintle, “Applicant Attraction: the role of recruiter function, work-life balance policies and career salience”. *International Journal of Selection and Assessment*. Vol. 15 Issue 4. (December 2007). Pg 394 – 404.
- Dell Technologies. “Gen Z: The future has arrived”. *Dell Technologies sales document*. Last modified [or accessed] 1 May 2021. <https://www.delltechnologies.com/en-us/collaterals/unauth/sales-documents/solutions/gen-z-the-future-has-arrived-complete-findings.pdf>
- De Waal, A. “Increasing Organizational Attractiveness: The role of the HPO and happiness at work frameworks”. *Journal of Organizational Effectiveness: People and Performance*. Vol. 5, no. 2. (2018)
- Director Naval Platform Systems - Ship Design Group. “Habitability Study of BCD vs Halifax Class”. (Prepared for PMO CSC, April 2019).
- Dimock, Michael. “Defining generations: Where Millennials end and Generation Z begins”. *Pew Research Center*. Last modified [or accessed] 25 April 2021. <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>
- Ender, Morten, David Rohall, Michael Matthews. *The Millennial Generation and National Defense: Attitudes of Future Military and Civilian Leaders*. Hampshire: Palgrave Macmillan, 2014.

- Government of Canada. “Canadian Surface Combatant: Project summary”. Last modified [or accessed] 20 April 2021. <https://www.canada.ca/en/department-national-defence/services/procurement/canadian-surface-combatant.html>
- Government of Canada. “Canadian Surface Combatant: Program overview”. Last modified [or accessed] 19 April 2021. <https://www.canada.ca/content/dam/dnd-mdn/documents/quad-charts/csc-quad-chart-en.pdf>
- Government of Canada. “HMCS *Halifax*”. Last modified [or accessed] 26 April 2021. <https://www.canada.ca/content/dam/themes/defence/caf/militaryhistory/dhh/documents/lineages/halifax.pdf>
- Landrum, Sarah. “Millennials and Quality: The Search for a Better Everything”. *Forbes*, 14 April 2017. Last modified [or accessed] 7 March 2021. <https://www.forbes.com/sites/sarahlandrum/2017/04/14/millennials-and-quality-the-search-for-a-better-everything/?sh=7818a129347a>
- Mercier, Lt(N) Samuel. “Habitability Report”. Royal Canadian Navy Habitability Working Group, Canadian Armed Forces, 2020.
- Myers, Karen and Kamyab Sadaghiani. “Millennials in the Workplace: A Communication Perspective on Millennials’ Organizational Relationships and Performance”. *Journal of Business and Psychology*. Vol. 25, Iss 2. (New York, June 2010). 225 – 238. <https://search-proquest-com.cfc.idm.oclc.org/docview/196897414/fulltextPDF/9EF2B960115435DPQ/1?accountid=9867>
- Ott, Bryant, Nikki Blacksmith, Ken Royal. “What Generation Gap? Job seekers from different generation often look for the same things from prospective employers, according to recent Gallup research”. *Gallup Business Journal*. Last accessed [or modified] 22 April 2021, <https://news.gallup.com/businessjournal/104845/something-generations-can-agree.aspx>
- Sahni, John. “Quality of Work Life (QWL), Quality of Life (QOL) and Happiness: Exploring the Linkages for Millennial Workforce”. *Proceedings on Engineering Sciences*. Vol. 1, no.2. (Winter, 2019). 815 – 824. <http://pesjournal.net/journal/v1-n2/86.pdf>