

Canadian  
Forces  
College

Collège  
des  
Forces  
Canadiennes



## THE LITTORAL COMBAT SHIP: WRONG SHIP AT THE RIGHT TIME

Lieutenant-Commander Ryan Verbenkov

**JCSP 47**

**Service Paper**

**Disclaimer**

Opinions expressed remain those of the author and do not represent Department of National Defence or Canadian Forces policy. This paper may not be used without written permission.

© Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence, 2021.

**PCEMI 47**

**Étude militaire**

**Avertissement**

Les opinions exprimées n'engagent que leurs auteurs et ne reflètent aucunement des politiques du Ministère de la Défense nationale ou des Forces canadiennes. Ce papier ne peut être reproduit sans autorisation écrite.

© Sa Majesté la Reine du Chef du Canada, représentée par le ministre de la Défense nationale, 2021.



CANADIAN FORCES COLLEGE - COLLÈGE DES FORCES CANADIENNES

JCSP 47 - PCEMI 47  
2020 - 2021

SERVICE PAPER – ÉTUDE MILITAIRE

**THE LITTORAL COMBAT SHIP: WRONG SHIP AT THE RIGHT TIME**

By Lieutenant-Commander Ryan Verbenkov

*“This paper was written by a candidate attending the Canadian Forces College in fulfillment of one of the requirements of the Course of Studies. The paper is a scholastic document, and thus contains facts and opinions which the author alone considered appropriate and correct for the subject. It does not necessarily reflect the policy or the opinion of any agency, including the Government of Canada and the Canadian Department of National Defence. This paper may not be released, quoted or copied, except with the express permission of the Canadian Department of National Defence.”*

Word Count: 2,258

*« La présente étude a été rédigée par un stagiaire du Collège des Forces canadiennes pour satisfaire à l'une des exigences du cours. L'étude est un document qui se rapporte au cours et contient donc des faits et des opinions que seul l'auteur considère appropriés et convenables au sujet. Elle ne reflète pas nécessairement la politique ou l'opinion d'un organisme quelconque, y compris le gouvernement du Canada et le ministère de la Défense nationale du Canada. Il est défendu de diffuser, de citer ou de reproduire cette étude sans la permission expresse du ministère de la Défense nationale. »*

Nombre de mots : 2.258

# THE LITTORAL COMBAT SHIP: WRONG SHIP AT THE RIGHT TIME

## AIM

1. The Littoral Combat Ship (LCS) was designed to be a fast, flexible, and mission-oriented vessel for use by the United States Navy (USN) to function in near-shore environments. After 13 years, since the first LCS was commissioned, most of the design intentions have not been met. All of this, combined with significant schedule and cost overruns, has led to a reduction of hulls being built and the early decommissioning of LCS 1 through 4, the newest one, the USS Coronado, being only 6 years old.<sup>1</sup> In hindsight, the LCS program was set up for failure from the onset and many lessons learned can be drawn from this poorly executed project. The Royal Canadian Navy (RCN) is currently in the early years of the largest peacetime recapitalization of its fleet. This paper will expand on the failures of the LCS program and provide recommendations to better prepare the RCN for success during their major recapitalization projects.

## INTRODUCTION

2. The LCS is comprised of two separate classes: the Independence-Class, built by General Dynamics; and the Freedom-Class, built by Lockheed Martin. The LCS was intended to “be a networked, agile, stealthy surface combatant capable of defeating anti-access and asymmetric threats in the littorals.”<sup>2</sup> The first two LCS, USS Freedom and Independence, were commissioned in October 2008 and October 2010, respectively.<sup>3</sup>

3. Significant cost overruns on these two lead ships led the Navy to slow the project down so congress would not cancel it. While the initial budget for the project was \$220 million (M) per ship, the program ended up costing \$655M per ship.<sup>4</sup> Also, many design and performance issues were identified after numerous hulls had already been built or were in production. Furthermore, the survivability of the LCSs were proven to be drastically underrated, to the point where the LCSs could not operate without being under the protection of heavier, better-armed warships.<sup>5</sup> Finally, the USN designed the ships around an unproven optimal manning construct, which was eventually determined to be unsustainable, even during peacetime.<sup>6</sup> The outcome of all these force development issues was a reduction of LCS platforms from 55 to 31, a massive redesign of the LCS

---

<sup>1</sup> David Larter, "US Navy's First 4 Littoral Combat Ships to Leave the Fleet in 9 Months," *Defense News*, July 01, 2020, <https://www.defensenews.com/naval/2020/07/01/the-us-navys-first-4-littoral-combat-ships-are-out-of-the-fleet-in-9-months/>.

<sup>2</sup> NAVSEA, "Supervisor of Shipbuilding, Conversion & Repair," accessed 31 January, 2021, <https://web.archive.org/web/20120301113457/http://www.navsea.navy.mil/supship/Bath/Products.aspx>.

<sup>3</sup> Wikipedia, "Littoral Combat Ship," accessed 31 January 2021, [https://en.wikipedia.org/w/index.php?title=Littoral\\_combat\\_ship&oldid=1001164404](https://en.wikipedia.org/w/index.php?title=Littoral_combat_ship&oldid=1001164404).

<sup>4</sup> David Axe, "Why the Navy's Littoral Combat Ship is a Complete Failure," *Task & Purpose*, 22 May 2019, <https://taskandpurpose.com/analysis/navy-littoral-combat-ship-failure/>.

<sup>5</sup> Office of the Director, Operational Test and Evaluation, *Director, Operational Test and Evaluation FY 2010 Annual Report*, (2011), 145.

<sup>6</sup> Mckinnya J. Williams-Robinson, "A Littoral Combat Ship Manpower Analysis using the Fleet Response Training Plan" (Naval Postgraduate School, 2007), 53-54.

mid-project, and a refit of the older variants. In 2014, the USN committed to building more traditional, heavily armed frigates to supplement 20 of the platforms that were cut from the LCS program.<sup>7</sup>

4. As the RCN is at the very beginning of a long road to recapitalize its fleet, the failures in the LCS program need to be understood and learned from to prevent a similar outcome. The LCS were, on paper, inexpensive, capable, leanly manned, and built with a modular design that could be interchanged depending on the mission. With a smaller navy faced with fiscal restraints, it is not hard to imagine the RCN being tempted to follow in the USN's footsteps and make similar mistakes if trying to expedite steps in the procurement process to get approval from the government.

## **DISCUSSION**

5. In the post-cold era, when new threats began to emerge, the USN quickly began to realize that their aircraft carriers, destroyers, and cruisers, designed to operate in the open ocean, were not well suited to defend against threats in coastal areas, otherwise known as littoral waters. Emerging asymmetric threats, such as Fast Inshore Attack Craft, could be armed with suicide bombs or rocket-propelled grenades and operate alone or in swarms. These littoral threats had the potential to expose a serious capability gap with the existing fleet with their inability to defend against them.<sup>8</sup>

6. When Donald Rumsfeld became Secretary of Defense in 2001, he promised transformation, specifically that the Department of Defense had “to take risks and try new things.”<sup>9</sup> The USN was immediately under pressure from Rumsfeld to increase the fleet from 300 to 375 vessels, despite being under fiscal constraints. As such, the USN immediately looked toward the LCS program, which promised a smaller \$220M warship that could be built at a rate of five vessels per year. These ships were envisioned to be fast, agile, small, lightly armed, and capable of operating in littoral regions. They were also considered expendable, meaning if they were hit with enemy fire, they would likely be abandoned. In fear of congress canceling the program, the USN committed \$15 billion (B) to build 55 LCS before requirements had been set, a concept of operations identified, or survivability criteria set. Doubling down on the LCS, the USN identified the LCS as its number-one priority and promised to build the ships at “lightning speed” despite a rigorous design or requirements analysis not having been completed.<sup>10</sup>

7. Only after committing to the program, was an LCS Task Force stood up to identify the requirements. At this point, scope creep started to set in. The LCS was originally envisioned to be expendable in the event of combat damage, however, it was

---

<sup>7</sup> Sam LaGrone, "SNA: Modified Littoral Combat Ships to be Designated Frigates," *USNI News*, 15 January 2015, <https://news.usni.org/2015/01/15/sna-modified-littoral-combat-ship-class-changed-fast-frigate>.

<sup>8</sup> David Galligan, George Galdorisi and Peter Marland, "Net Centric Maritime Warfare – Countering a ‘Swarm’ of Fast Inshore Attack Craft" (13-16 June, 2005).

<sup>9</sup> David Axe, "How the Navy’s Warship of the Future Ran Aground," *Wired.Com*, 3 Aug, 2011, <https://www.wired.com/2011/08/future-warship-ran-aground/>.

<sup>10</sup> *Ibid.*

later decided that it had to be survivable.<sup>11</sup> Furthermore, it was determined that the core crew size would be limited to 15-50 people (ideally 40 people), with minimal rationale provided on how this number was obtained.<sup>12</sup> The ship, originally envisioned to counter asymmetric threats in littoral waters, would now be capable of carrying out surface warfare, anti-submarine warfare, mine countermeasures, irregular warfare, amphibious landings of special forces, and drug and piracy patrols. The LCS was then required to operate close to shore, sail across the ocean on its own, and carry a helicopter.<sup>13</sup> It is easy to see how significant budget over-runs started to emerge with the scope creep of LCS requirements.

8. For the LCS to carry out the six missions identified previously, it was decided that the ship would be a modular design, meaning mission-specific modules could be swapped out and fitted. The idea was that these could be changed in a day in any home or friendly port.<sup>14</sup> Further, many unmanned vehicles were included in the modules, including an autonomous submarine, helicopter, and a mine-detecting submersible drone. When the requirements for the modules were set, it was discovered that the modules did not yet exist and would have to be built from the ground up, further increasing the risk of cost overruns.<sup>15</sup> To complicate matters, the USN selected two completely different prototypes for LCS 1 and 2 as test ships. Even with all of these changes to the requirements, and the \$15B contract already signed, the USN continued to insist that each LCS would cost no more than \$220M.<sup>16</sup>

9. Once the initial cost of the LCS program had more than tripled the cost per ship, production was halted in 2008. With only the first two ships under construction, this subsequently delayed production by several years while the USN revamped the program and sought additional funding.<sup>17</sup> Even when construction recommenced, complications arose with the mission-modules, many of which failed testing and saw significant cost overruns of their own. Ultimately, the USN ended up with far fewer mission-modules that operated at a reduced capability to what was originally envisioned. Additionally, the modules that were expected to take only one day to swap out, ended up taking 12-29 days, which significantly increased the time the LCS would be out of operations if a mission changed.<sup>18</sup>

---

<sup>11</sup> Ronald O'Rourke, *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress* (Washington, DC, 2019), 9.

<sup>12</sup> Ronald O'Rourke, *Navy Littoral Combat Ship/Frigate (LCS/FFGX) Program: Background and Issues for Congress* (Washington, DC, 2017), 6.

<sup>13</sup> United States Navy, *Preliminary Design Interim Requirements Document for Littoral Combat Ship (LCS)*, (Washington, DC, 2003), 4.

<sup>14</sup> *Ibid.*

<sup>15</sup> Kyle Mizokami, "The Navy is Looking for a New Frigate to Replace the Troubled Littoral Combat Ship," *Popular Mechanics*, 11 July 2027, <https://www.popularmechanics.com/military/navy-ships/news/a27258/navy-looking-for-a-new-frigate-replace-littoral-combat-ship/>.

<sup>16</sup> Axe, "How the Navy's Warship of the Future Ran Aground"...

<sup>17</sup> Ronald O'Rourke, *Navy Littoral Combat Ship (LCS) Program: Background, Oversight Issues, and Options for Congress* (Washington, DC, 2008).

<sup>18</sup> United States Government Accountability Office, *Navy Shipbuilding: Significant Investments in the Littoral Combat Ship Continue Amid Substantial Unknowns about Capabilities, use, and Cost. Statement of Paul L. Francis, Managing Director Acquisition and Sourcing Management* (Washington, DC, 2013), 5.

10. The survivability requirement was to ensure the LCS could withstand combat damage. In reality, it could not survive a hit given their commercial design which was adopted in a bid to reduce complexity and construction cost. The USN also waived the requirement to conduct survivability testing and accepted simulations and design analysis to save on costs.<sup>19</sup> This acceptance of the added risk was justified by the fact the LCS was fast and able to evade possible threats close to land.<sup>20</sup> However, as the program unfolded and the USN tried to figure out what missions they would assign the LCS, mission creep set in again. It was not long until the lightly armed LCS with limited survivability were operating in the open ocean as part of carrier strike groups and forward deployed to Singapore where they had the potential to face heavily armed Chinese vessels. When looking employing the LCS in these more complex missions, it gets a lot harder to justify operating a ship that does not meet minimum survivability requirements; however, at that point, there was no way to go back to the drawing board.

11. Finally, another glaring oversight with the LCS was the promise of a reduced core crew size of between 15 to 50 personnel. In a report to the Government Accountability Office, it was acknowledged that the LCS crew size grew to 98 personnel “due to the inadequacy of the original manpower assumptions coupled with additional mission requirements to support ship operations.”<sup>21</sup> A thorough analysis was never completed to back the reduced crewing numbers and because of this, with only 50 personnel on board initially, the LCS had an incredibly hard time sustaining operations, even during low tempo peace-time sailings. Because of the demands on the crew, the LCS became less mission-capable the longer it stayed at sea due to crew fatigue. Coupled with the fact that maintenance was unable to be carried out due to insufficient crew size, the result was numerous mechanical breakdowns that led many LCS to be taken out of operations for repairs.<sup>22</sup> This all added up to a ship that was unable to carry out even the most basic missions because of inadequate research and analysis being done to establish the correct crew size for an LCS platform.

12. Luckily, the USN was able to salvage the LCS project. In the end, 35 LCS will be built and after many lessons learned, the USN began building more heavily armed LCS and retrofitting older variants. Unfortunately, the USN determined that LCS 1 through 4, being the oldest variants, were too costly to upgrade and would be placed into inactive reserve status.<sup>23</sup> Given the issues experienced with building and swapping out mission modules, the USN has decided that the LCS will be used for a single warfare purpose, meaning the modules will be a “semi-permanent installation of mission package systems

---

<sup>19</sup> United States Government Accountability Office, *Littoral Combat Ship and Frigate: Congress Faced with Critical Acquisition Decisions. Statement of Paul L. Francis, Managing Director, Acquisition and Sourcing Management*, (Washington, DC, 2016), 8.

<sup>20</sup> Jason Sherman, "Pentagon Waives Testing Requirements for Navy's Littoral Combat Ship," *Inside the Pentagon's Inside the Navy* 24, no. 24 (2011). <https://search-proquest-com.cfc.idm.oclc.org/trade-journals/pentagon-waives-testing-requirement-navys/docview/920878177/se-2?accountid=9867>.

<sup>21</sup> United States Government Accountability Office, *Navy Force Structure: Actions Needed to Ensure Proper Size and Composition of Ship Crews* (Washington, DC, 2017), 30.

<sup>22</sup> Hope Hodge Seck, "Navy Orders Stand-Down of Littoral Combat Ships After Breakdowns," *Military.Com*. 6 September 2016, <https://www.military.com/daily-news/2016/09/06/navy-orders-stand-down-of-littoral-combat-ships-after-breakdowns.html>.

<sup>23</sup> Larter, "US Navy's First 4 Littoral Combat Ships to Leave the Fleet in 9 Months"...

in the sea frames, dedicating specific ships to specific missions.”<sup>24</sup> The 31 LCS that the USN will receive is a drastic cut from the 55 originally planned, but at least the program was salvaged. While the original concept of operations of the LCS has changed, the USN will have a ship that will be equipped to fight in littoral areas.

13. Examining the lessons learned from the LCS can benefit the RCN, especially in this time of our fleet recapitalization. With regular cost overruns and schedule delays of the RCN’s new ships, it is easy to understand how the CAF leadership could pressure Major Capital Projects to find ways to cut costs and accept risks in an attempt to limit scrutiny from politicians who can ultimately make or break those projects. Given the small size of the RCN, it will likely not have the resources, budget, or ability to salvage a project that is as poorly managed as the LCS program was.

## **CONCLUSION**

14. The LCS program was unlike anything ever attempted by the USN. With increasing threats in littoral regions, the USN quickly realized their large, open ocean ships were not well-suited to carry out operations close to shore. The LCS was the ideal solution on paper, being cheap, fast, maneuverable, and fit for a multitude of missions with a modular design. Unfortunately, the USN rushed the initial stages of the military equipment acquisition process in an attempt to expedite the project timeline and approval process. The outcome was the construction of the LCS occurring concurrently with the requirements identification and options analysis phase. With this lack of identifying clear requirements before contracts being signed and construction beginning, problems were encountered and scope creep set in. This resulted in massive project delays and cost overruns. Ultimately, the USN was trying to push the project through as fast as they could because of political pressure from above. What they ended up with was a less capable ship that was delivered behind schedule and well over budget. Luckily, because of the sheer size and resources available to the USN, the project, while reduced in the number of hulls and capability, was ultimately able to recover and arguably be successful. If this scenario were to occur in one of the RCN phases of the procurement process, this would likely be catastrophic given the far fewer resources and budgetary leeway afforded to the RCN.

## **RECOMMENDATION**

15. As the RCN continues through the largest peacetime recapitalization of its fleet, it is recommended that project managers adhere to the Defence Procurement Process.<sup>25</sup> Diverging from this process in an attempt to streamline the schedule and get approval from politicians was what derailed the LCS project. The concept of the LCS is extremely relevant to deter littoral threats faced by the USN and RCN. While the RCN has smaller vessels such as the Kingston and Orca Classes that can operate more easily in the

---

<sup>24</sup> The Office of the Director, Operational Test & Evaluation, *FY 16 Navy Programs: Littoral Combat Ship (LCS)* (Washington, DC, 2017), 259.

<sup>25</sup> National Defence, "Defence Purchases and Upgrades Process," accessed 2 Feb 2021, <https://www.canada.ca/en/department-national-defence/services/procurement/defence-purchases-and-upgrades-process.html>.



littorals, they are not heavily armed, are designed mostly to civilian standards and have limited offensive capability. As such, it is recommended the RCN investigate a littoral capability similar to the LCS. As well, the modular design that allows the LCS to be, in theory, capable of assuming a wide array of missions is a very relevant capability that the RCN should pursue. With a fleet that is likely to remain small, having mission flexible modules would be a significant benefit to the RCN and would provide multi-mission platforms while also allowing ships to force generate across a broad spectrum of operations.

## BIBLIOGRAPHY

- Axe, David. 2011. "How the Navy's Warship of the Future Ran Aground." *Wired.Com*, Aug 3. <https://www.wired.com/2011/08/future-warship-ran-aground/>.
- . 2019. "Why the Navy's Littoral Combat Ship is a Complete Failure." *Task & Purpose*, May 22. <https://taskandpurpose.com/analysis/navy-littoral-combat-ship-failure/>.
- Galligan, David, George Galdorisi, and Peter Marland. 2005. "Net Centric Maritime Warfare – Countering a 'Swarm' of Fast Inshore Attack Craft." 13-16 June 2005.
- LaGrone, Sam. 2015. "SNA: Modified Littoral Combat Ships to be Designated Frigates." *USNI News*, January 15. <https://news.usni.org/2015/01/15/sna-modified-littoral-combat-ship-class-changed-fast-frigate>.
- Larter, David. 2020. "US Navy's First 4 Littoral Combat Ships to Leave the Fleet in 9 Months." *Defense News*, July 01. <https://www.defensenews.com/naval/2020/07/01/the-us-navys-first-4-littoral-combat-ships-are-out-of-the-fleet-in-9-months/>.
- Mizokami, Kyle. 2017. "The Navy is Looking for a New Frigate to Replace the Troubled Littoral Combat Ship." *Popular Mechanics*, July 11. <https://www.popularmechanics.com/military/navy-ships/news/a27258/navy-looking-for-a-new-frigate-replace-littoral-combat-ship/>.
- National Defence. "Defence Purchases and Upgrades Process," Accessed 5 February 2021, <https://www.canada.ca/en/department-national-defence/services/procurement/defence-purchases-and-upgrades-process.html>.
- NAVSEA. "Supervisor of Shipbuilding, Conversion & Repair," Accessed 31 January 2021, [https://web.archive.org/web/20120301113457id\\_/http://www.navsea.navy.mil/supship/Bath/Products.aspx](https://web.archive.org/web/20120301113457id_/http://www.navsea.navy.mil/supship/Bath/Products.aspx)
- Office of the Director, Operational Test and Evaluation. 2011. *Director, Operational Test and Evaluation FY 2010 Annual Report*. <https://www.dote.osd.mil/Publications/Annual-Reports/2010-Annual-Report/>
- O'Rourke, Ronald. 2008. *Navy Littoral Combat Ship (LCS) Program: Background, Oversight Issues, and Options for Congress*.
- . 2017. *Navy Littoral Combat Ship/Frigate (LCS/FFGX) Program: Background and Issues for Congress*. <https://fas.org/sgp/crs/weapons/RL33741.pdf>

- . 2019. *Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress*. <https://apps.dtic.mil/sti/pdfs/ADA501132.pdf>
- Seck, Hope Hodge. 2016. "Navy Orders Stand-Down of Littoral Combat Ships After Breakdowns." *Military.Com*, September 6. <https://www.military.com/daily-news/2016/09/06/navy-orders-stand-down-of-littoral-combat-ships-after-breakdowns.html>.
- Sherman, Jason. 2011. "Pentagon Waives Testing Requirements for Navy's Littoral Combat Ship." *Inside the Pentagon's Inside the Navy* 24, no.24 (20 June 2011). <https://search-proquest-com.cfc.idm.oclc.org/trade-journals/pentagon-waives-testing-requirement-navys/docview/920878177/se-2>.
- The Office of the Director, Operational Test & Evaluation. 2017. *FY 16 Navy Programs: Littoral Combat Ship (LCS)*.
- United States Government Accountability Office. 2016. *Littoral Combat Ship and Frigate: Congress Faced with Critical Acquisition Decisions. Statement of Paul L. Francis, Managing Director, Acquisition and Sourcing Management*.
- . 2017. *Navy Force Structure: Actions Needed to Ensure Proper Size and Composition of Ship Crews*. <https://www.gao.gov/assets/690/684771.pdf>
- . 2013. *Navy Shipbuilding: Significant Investments in the Littoral Combat Ship Continue Amid Substantial Unknowns About Capabilities, Use, and Cost. Statement of Paul L. Francis, Managing Director Acquisition and Sourcing Management*.
- United States Navy. 2003. *Preliminary Design Interim Requirements Document for Littoral Combat Ship (LCS)*.
- Wikipedia, "Littoral Combat Ship," Accessed 31 January 2021. [https://en.wikipedia.org/w/index.php?title=Littoral\\_combat\\_ship&oldid=1001164404](https://en.wikipedia.org/w/index.php?title=Littoral_combat_ship&oldid=1001164404).
- Williams-Robinson, Mckinny J. 2007. "A Littoral Combat Ship Manpower Analysis using the Fleet Response Training Plan." Naval Postgraduate School.