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Navigating the Perfect Storm

An Alternative Crewing & Ship Readiness Model

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In November 2023, the commander of the Royal Canadian Navy (RCN), Vice-Admiral Angus Topshee, issued a warning: the Navy is in a “critical state,” with ships running beyond their life expectancies and a severe shortage of sailors to operate them.¹ The personnel crisis is particularly problematic, as building and maintaining a well-trained community of sailors is even more complex than constructing the ships they sail in.

In response to this crisis, this paper proposes an alternative crewing and maintenance model for RCN ships. This system is designed to allow for longer and more frequent ship maintenance periods and regulating personnel tempo, while also relieving the strain on some of the most critical trades – such as maritime technicians (MARTECHs). For simplicity, this paper will focus on the East Coast surface fleet and not account for augmentees that come from other elements, such as the Air Force. The focus is on Canada’s current fleet and near-term deliveries (the Joint Support Ships, or JSS). Over the longer term, however, the conclusions reached could equally be applied to the River-class destroyers as they become operational.

Given the scope of the challenge, this work offers only a general framework for managing personnel and ship readiness in the RCN. The intricacies and interplay amongst RCN departments, trades, and training would create significant friction and certainly require further adaptation. As such, further study will be required to identify bottlenecks and challenges that hinder implementation. Despite this complexity, this system offers a basic framework for change that may begin to alleviate some of those critical problems now limiting the fleet’s operational readiness and long-term sustainability.

The Problem

As the RCN embarks on one of the largest recapitalizations in its history, it faces significant headwinds. Apart from the obvious challenges surrounding multiple, major procurement projects, the Navy is navigating a perfect storm in trying to crew these (and existing) ships. The Navy is now operating with a lack of trained personnel in critical trades. It is facing poor retention and

recruiting numbers, and it is seeking to attract new members with a fleet that is at the end of life, with replacement vessels years away.

From a recruitment point of view, the RCN has not delivered on its efforts to fill critical requirements for the past 10 years.² The resulting strain on the fleet's overtaxed sailors is exacerbating the problem. Some estimates put a recovery in the RCN's personnel sustainability at more than a decade away. That is also the best-case scenario, with other projections looking out even further.³

Part of the problem has been an inability to replace the fleet's old ships. The newest frigate is now nearly 30 years old and nearing the end of its useful 'end-of-life extension' period, which came from the *Halifax*-class modernization in the mid-2000s. As a result, maintenance periods for the frigates are longer and more frequent, reducing the ships' availability for both operations and training. For the ships that are operational, equipment repair and maintenance are more demanding, negatively impacting crews – particularly MARTECHs. As such, workloads are increasing exponentially and fatigue building as crews fight to keep ships at sea.

The Current Model

Currently, the RCN posts one crew to each ship. The crew is augmented by an air detachment or other specialized personnel. At full readiness (which is currently unrealistic except in times of war, but better illustrates the challenge), Maritime Forces Atlantic (MARLANT) would need to crew upwards of seven frigates, with a crew complement of 225 per ship; six Maritime Coastal Defence Vessels (MCDVs), with a crew complement of 45; three Arctic and Offshore Patrol Vessels (AOPVs), with a crew complement of 65; and (soon) one JSS, with a projected crew complement of 199.⁴ Without examining specific trades or accounting for ships in long-term refit that may not have a full crew posted, this crewing model requires a total of 2,239 personnel for maximum readiness.

These crew numbers are not achievable with the RCN's current numbers. Defence Research and Development Canada (DRDC) scientists have completed studies for all classes of ship using SCORE software, with algorithms that account for sleep cycles, watch and station bills, the types of operations and numbers required for them, and damage control requirements.⁵ Optimally, all billets in a ship should be filled to maximize operational readiness and effectiveness and to disperse workloads evenly over an appropriate number of personnel. Today, however, the RCN is over 1,500 trained officers and non-commissioned members (NCM) short, an increase of almost 1,000 since 2019.⁶

This deficiency is exacerbated by the fact that recruiting has been falling short every year. There are also significant retention problems in critical trades, particularly MARTECHs.⁷ Internal capacity issues have also limited the availability of crews. According to a 2022 personnel snapshot of MARLANT, approximately 25% of NCMs have medical limitations (MELs), representing almost 750 of the 3,100 sailors on the East Coast.⁸ Although not all of these members are "unfit sea," a great number of them cannot sail.⁹ Additionally, due to crewing shortfalls across the Navy, even when a ship is not sailing, sailors are required to "pier-head jump" to other ships to fill critical empty billets owing to a lack of trained personnel, or to replace sailors not available due to MELs.

While this works in the short term, these sailors soon become overworked and subject to burnout.¹⁰ It is a self-perpetuating problem that is exacerbated with each instance.

According to the MARLANT Sea Days schedule for fiscal year 2023, East Coast ships averaged only 59 days at sea.¹¹ Those numbers are skewed further by the fact that many of those sea days were by MCDVs, *Asterix*, and AOPVs – all non-combatants. This is evidence of severe limitations to the RCN's operational readiness, and much is owed to crewing shortfalls.

A Revised Crewing Model

Strong, Secure, Engaged demands that the RCN have (at a minimum) “the ability to deploy and sustain two naval task groups, each composed of up to four combatants and a Joint Support Ship on each coast ... and where warranted, a submarine”¹² Current force readiness closer reflects the following:

- one ship to serve as a Ready Duty Ship
- one frigate at high readiness (HR) to serve as a Single Ship International Deployer
- one submarine at either Normal Readiness (NR) or HR
- a small number of non-combatants (with significantly less crew demands)

The crewing numbers needed to maintain and sustain a naval task group on each coast are not achievable, and the situation will continue to degrade as CPFs require longer maintenance periods to bridge the gap to the River-class. Notwithstanding submarines – which are not examined here – the model proposed in this paper should, however, allow for all readiness directives to be achieved, enabling the RCN to deploy up to two naval task groups (one on each coast) simultaneously.¹² More specifically, this model should support a naval task group of at least two combatants (frigates or destroyers), two AOPVs, and one support ship on each coast for 18 months of a 24-month period. In the future, with 15 River-class destroyers operational, the naval task groups could meet the ‘always ready’ task group requirement defined in SSE.

The concept of rotational crewing has, historically, been implemented to maximize the amount of time a ship could operate overseas, and it is most commonly employed by the United States Navy (USN). This model sees ‘Blue’ and ‘Gold’ crews being posted to a single ship, with the crew rotating every few months. This allows the ship to remain abroad while crews alternate to allow for training and recovery time while away, as well as sustained operations while at sea.¹³ The model proposed for the RCN employs the same rotational crewing concept, though with the opposite goal. This is to permit the Navy's hulls frequent and longer maintenance periods than currently afforded, while providing a more consistent routine and battle rhythm for personnel. For crew, this would include a dedicated recuperation period and guarantee a high-readiness deployment opportunity every 18 months – which can contribute to higher retention rates.

Unlike the USN model, which has crews rotating on one specific ship, the RCN should rotate both crews and hulls, allowing a crew's operational tempo to match that of a particular hull until both the crew and the ship enter a maintenance and/or recuperation period. Hulls entering this period would remain in extended work periods of 18–24 months, allowing the RCN to conduct the significant maintenance required to keep frigates operational. Personnel would continue to rotate on an 18-month cycle modelled after Canadian Special Operations Forces Command

(CANSOFCOM) personnel tempo. Sailors would be posted to class-specific crews (frigates/AOPV/MCDV (if desired)), rather than specific hulls as in the past – with the exception of the JSS, as there will only be one hull per coast. The crew rotation would be six months at standard readiness, six months at high readiness (optimally deployed), and, finally, six months for training, personal development, recuperation, and downtime.

This cycle would allow sailors to maintain a consistent operational tempo, gain consistent deployment opportunities, and receive low-tempo training and downtime periods with the primary goal of recuperation and reconnecting with families. Critically, these are all contributors to improved retention.

Ultimately, MARLANT requires three frigate (or future destroyer) crews, three AOPV crews, and one JSS crew (Figure 2) to enable at least:

- one HR frigate deployer
- one SR frigate deployer
- two SR AOPVs (with the ability to have an HR deployer on the same cycle as the HR frigate if desired)
- one JSS (SR or HR) in its own rotation (Figure 1)

Aside from the advantages of maximizing the maintenance windows for frigates and maintaining adequate windows for the new AOPVs and JSS, there are additional benefits to this system. First, pier-head jumping should be minimized and optimally non-existent. Crews would remain with one ship class and become experts in that class. Second, crews would remain consistent, and teams would be built and remain together. Although the hull may be different, the highly trained team would remain intact. Third, where there may be some unique features in some hulls of the same class, a crew would have a full six-month SR period to adapt to any differences prior to HR and deployed operations.

When a ship is in a long work period, the crew is typically employed in a shore office, where sailors are often used as a manning pool to supplement the remainder of the fleet. The current model forces the RCN to have either an underemployed crew for a large percentage of the year or sailors who are extremely overworked as they are poached from ship to ship. Ship maintenance periods (Short, Extended, or Dock) are scattered throughout the year, with the only consistent operational period being a deployment. This lack of rhythm also has a negative impact on ships, as there is often not enough time in a specific work period to complete the necessary work, which can result in ships either being unable to sail when they should or additional wear and tear being put on equipment that was not addressed in the allotted maintenance period. The proposed ship and crew rotation plan addresses both issues.

This model is not intended to be a temporary fix. Properly implemented, it could be used indefinitely, allowing for consistent, non-reactive maintenance periods for all hulls, while maximizing the number of serviceable ships. Additionally, the scalability of the model would allow for greater numbers of ships to be used in the operational rotation if sufficient trained personnel are brought into the Navy in the future. As the River class slowly replaces the *Halifax* class, and maintenance periods are reduced, more hulls would be available for operations. This

period would likely coincide with greater numbers of trained personnel being available to crew these ships as recruiting and retention initiatives take hold.

Figure 1: Proposed Ship Rotation Model

Figure 1 illustrates a typical 18-month operational cycle, allowing for a personnel tempo that would match the ship class (six-month SR/six-month HR/six-month individual/team training, personal development, downtime). From an equipment standpoint, it would allow for maintenance periods of up to two years for frigates, six months to a year for AOPVs (if desired, AOPV could support an HR cycle as well), and six months for JSS. MCDVs would have a similar rotation. Throughout the 18-month cycle, 1,069 personnel would be required for all crews, 779 of those sea-going at any one time. All ships would be crewed to 100% without attached postings. This compares to over 2,000 personnel required to crew all ships, with upwards of 20% attached postings currently under the current crewing model.

In this model, one frigate would be available for extended maintenance for up to two years, while remaining frigates would be available for extended maintenance for up to 18 months.

Figure 1 provides an example of a frigate operational tempo, which would have one crew assigned to it through the 18-month cycle. That crew would then take frigate-7 in the next rotation (not shown).

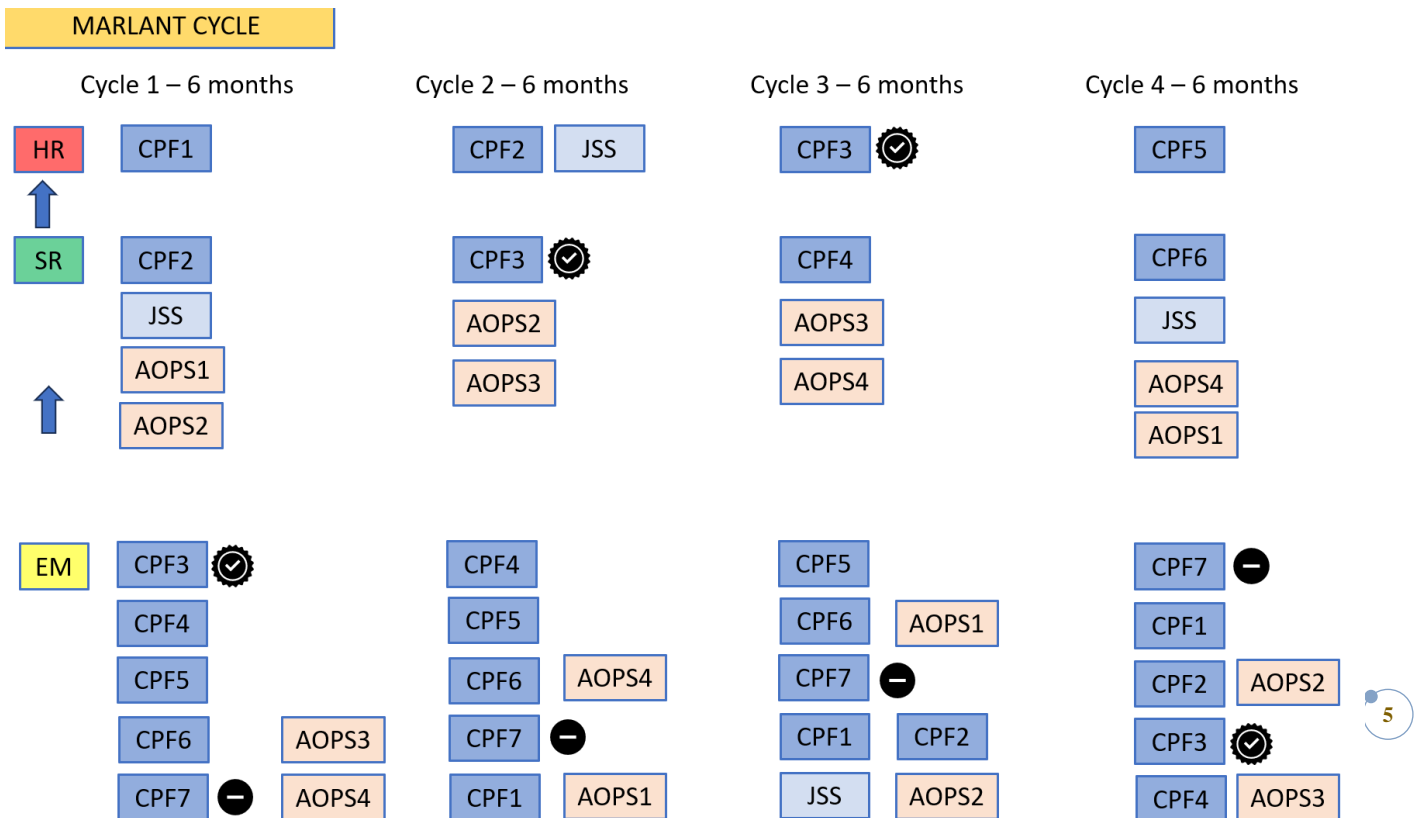
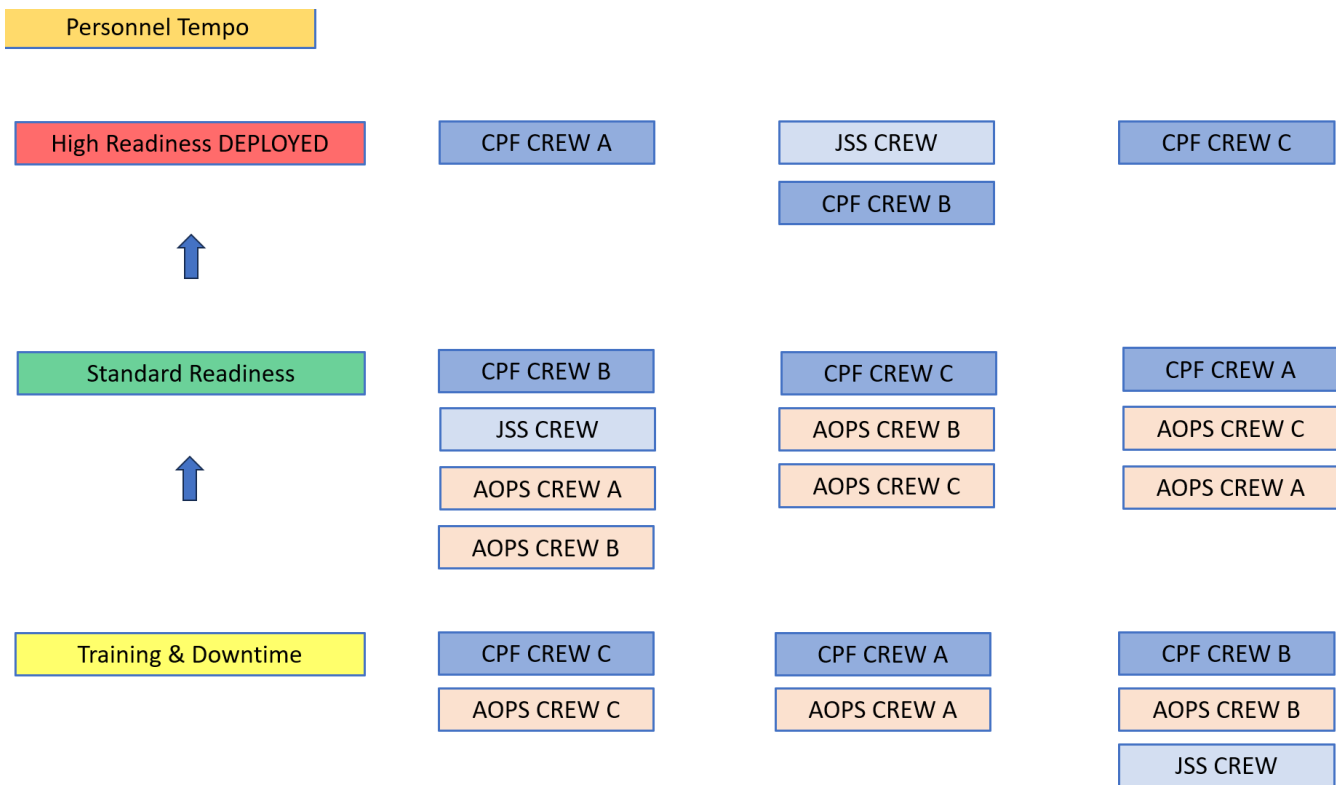


Figure 2: Proposed Crew Rotation and Tempo

This chart depicts the crew rotation model required to support the ship rotation model in Figure 1.

CANSOFCOM and other smaller elements of the Army and Air Force employ an 18-month rotational personnel tempo: six months for training, personal time, and recovery; six months for the equivalent of standard readiness – which could include more advanced training – and medium-tempo operations; and, lastly, six months of high-readiness deployed operations.

Personnel would be posted to a frigate crew, AOPV crew, or JSS crew and cycle through at the same tempo as the ship, regardless of the specific hull. The JSS, with only one hull per coast, would have only one crew, therefore following the tempo of the ship.



The Challenges

The most significant obstacle to this proposal is that Fleet Maintenance Facilities (FMF) do not have the capacity to do the additional work to support the proposed ship rotation. As such, a significant investment of time, people, and money will be required to keep the RCN's frigates operational over the next 15 years, and therefore, the gap may be smaller than at first glance. To accomplish this, a significant civilian workforce will need to be hired on both coasts. Furthermore, the intent is that out-of-routine ships would not have duty watches or engineers/technicians available for routine maintenance. Therefore, care and custody of out-of-routine ships would need to be taken over by the FMF or Assistant Deputy Minister (Materiel) (ADM(MAT)) and then returned to the Navy shortly before its new crew begins a short shakedown and sea trial period in advance of SR work-ups.

The bottom line is that this investment is necessary to maintain the *Halifax* class whether or not there are changes to the current maintenance schedule. As hulls and equipment continue to degrade, additional work and costs will be necessary. Further study is therefore required to identify the extent of this gap, the number of civilians required to take on the additional work, and the physical yard capacity needed.

There are other disadvantages of the proposed model that also need to be addressed. First, engineers and technicians posted to a specific hull for years will gain deep knowledge of that ship's unique issues. In this model, that deep knowledge would be lost or not transferable to the next hull in the rotation. Significantly longer work periods for all hulls would at least minimize the impact of this issue.

This model may also lead to a loss of pride in a specific ship, particularly for NCMs, who are typically posted to a specific ship for many years. Finally, the Navy should note a USN study on rotational crewing models, which highlighted a decline in ship's husbandry. This may have resulted from quick crew rotations and a lack of "ownership."¹⁴ This could happen in the RCN, though the impact in this case would likely be minimized owing to the increased cohesion from the crew remaining together.

Conclusion

The RCN fully understands the challenges of today and tomorrow, but the current global landscape calls for decisive action and new thinking. For the RCN to remain relevant, it must be able to operate reliably to defend Canada and its interests at a time when global conflict seems ever closer. The two greatest threats to RCN effectiveness are its lack of deployable combat ships and the shortage of crews to sail them. Waiting for more than a decade for new ships, and hoping that recruitment and retention problems are fixed in the years to come, should not be considered a viable option. As Canada's interests are being attacked directly and indirectly, it is not reasonable to be 'Ready Aye Ready' a decade from now at the expense of today's threat.

One response to the RCN's pressures is an overhaul of the current crewing system to keep an aging fleet operational and better manage crews' schedules and lives. By upending the way things have always been done and implementing a set – yet scalable – rotation of ships and crews, the RCN can improve the reliability and predictability of its forces. This system would also facilitate a

smoother operational tempo that would allow sailors to do the work they signed up for, while enforcing better work-life balance and improving recruiting, retention, and ship availability.

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Notes

¹ Sarah Ritchie, “Canadian navy in critical state, could fail to meet readiness commitments: commander,” *CBC News* (November 29, 2023).

² Joe Saballa, “Canadian Navy Readiness in ‘Critical State’: Commander,” *The Defence Post* (November 30, 2023).

³ Ibid.

⁴ RCN, “Surface Fleet,” <https://www.canada.ca/en/navy/corporate/fleet-units/surface.html>.

⁵ Renee Chow, Ramona Burke, and Dennis Witzke, “A Systems Approach to Naval Crewing Analysis: Coping with Complexity,” *Canadian Naval Review* 11:3 (2016), 16-21.

⁶ Director General Military Personnel Research and Analysis (DGMPPRA), “Establishment and Strength Report” (2023).

⁷ Ibid.

⁸ MARLANT, “Personnel Coordination Center Atlantic, Fleet Snapshot” (2022).

⁹ Joanne Anderson, Erin Wing, and Inez Dekker, “Retention and Attrition in the Hard Sea Occupations,” Defence Research and Development Canada Scientific Report DRDC-RDDC-2018-R307 (2018).

¹⁰ Stephanie Hartzell, “Personnel Challenges Faced by the Royal Canadian Navy,” JCSP 48 Service Paper (2022).

¹¹ MARLANT, Sea Days for Schedule MARLANT (2023).

¹² DND, *Strong, Secure, Engaged: Canada’s Defence Policy* (2017). Of note, SSE defines a naval task group as four combatants and one support ship

¹³ US Government Accountability Office, “Littoral Combat Ship: Deployment of USS Freedom Revealed Risks in Implementing Operational Concepts and Uncertain Costs” (July 2014).

¹⁴ Congressional Budget Office of the United States, “Crew Rotation in the Navy: The Long-Term Effect on Forward Presence” (October 2007).