The Unsinkable Corvette

'The little ship that could' is enjoying a renaissance in the global naval community.

Will corvettes brave the North Atlantic once again?

Once a major component of global naval forces, the corvette was a key contributor to the Allied victory in World War II. Since then, the role of the corvette has greatly diminished. In many cases this class of ship was removed entirely from naval forces as focus shifted to destroyers and submarines and, for the larger navies, aircraft carriers. This trend has recently seen a reversal however, as both naval planners and the governments that hold the purse strings have found new value in this compact yet potent platform.

Utilizing all of the benefits of modern technology, today's advanced corvettes offer functionality similar to larger warships at a fraction of the cost. Construction, operational costs and manpower are all substantially lower for a corvette, yet the platform can still be equipped to offer the surface, sub-surface and surface-to-air capability required for effective force projection. While the limited endurance of corvettes (less space for fuel, munitions and supplies) prevents them from becoming the predominant warship type, they capably augment the larger vessels and have proven extremely effective in certain niche roles.

The corvette is particularly well suited to littoral operations, where their small size and shallow draught are assets and their comparatively shorter range doesn't limit their utility. The United States Navy (USN) is hoping to capitalize on this compatibility with the Littoral Combat Ship (LCS), currently being developed as a part of the Focused Mission Vessel Study. This study will lead to the next-generation of surface combatants for the USN. They currently plan to produce 60 of these vessels.

Despite their smaller size, advances in hull form design along with computer controlled 'Fly-by-Wire' propulsion and stabilization have given modern corvettes a blue water capability far beyond their predecessors. This makes the corvette an ideal platform for interdiction operations within a nation's 200-mile Exclusive Economic Zone (EEZ). Vessels such as Sweden's Visby-Class, with its stealthy design and high speed, are capable of quickly intercepting potential threats with minimal risk of detection. With a detectible range of 4-12 nautical miles and a top speed of 35 knots, the Visby-Class can envelop a potential threat leaving only a minimal reaction time for the opposing vessel.

Beyond traditional interdiction and combat roles, the utility of smaller warships has been greatly enhanced through the use of modular payloads. Vessels such as the Canadian Multi-role Coastal Defence Vessel (MCDV) and the Danish Flyvefisken-Class Multi-role Vessel can be customized to fill any number of specific roles. The Flyvefisken-Class can be completely reconfigured and redeployed in less than an hour and can even be equipped for an anti-pollution role.

Given the versatility and cost effectiveness of the modern corvette, is there a role for this vessel type in the Canadian Navy? Given that the Senate Standing Committee on National Security and Defence, in their 2003 report "Canada's Coastlines: The Longest Under Defended Borders in the World" has stated that "Significant vulnerabilities currently exist along Canada's maritime approaches and major inland waterways that are undermining national security," defence planners would do well to examine the corvette's potential to meet our domestic maritime security needs.

Utilizing the recent technological advancements presented above, in particular the concept of modularity, a modern corvette could fill the capability gap between the MCDV and the Frigates/Destroyers and give Canada both a flexible and economical vessel for security throughout our ocean territory. For maxi-

mum utility, the following design elements should be considered: Speed, Sea Keeping, Surveillance, Force Projection, Interoperability, Flexibility and Efficiency of Operation.

Speed

The ability to intercept potential threats quickly, as far from the coast as possible, and ability to counter any evasive maneuvering, are essential attributes of an effective interdiction platform. Most corvettes are capable of speeds up to the 30-35 knot range, giving the speed required to intercept the vast majority of sea-going vessels.

Sea Keeping

The ability to operate in all Canadian waters is an obvious and essential requirement for a vessel designed to protect those waters. This includes some of the roughest sea conditions in the world. Additional consideration needs to be given to navigating the Arctic and integrating a 'First-Year Ice' capability. Enabling the Navy to operate in the Arctic would go a long way to asserting Canadian sovereignty over the Arctic and could prove a useful tool in resolving current border disputes with Denmark, the United States and Russia.

Surveillance

Ships have a limited 'line-of sight' surveillance capability. Augmenting ships with either a manned or unmanned aerial platform greatly increases their effectiveness. Additionally, a satellite data link with the coastal Maritime Security Operations Centre (in either Halifax or Esquimalt) will ensure the domain awareness necessary for effective response.

Significant research and development has gone into unmanned surveillance systems such as Defence Research & Development Canada's Stealth Buoy (pictured here) and various AUVs (Autonomous Underwater Vehicles).

Stealth Buoy

The modular design approach enables new technologies to be integrated quickly and will ensure Canada can effectively capitalize on these new technologies as they emerge.

Force Projection

Given the wide degree of threats we could face at sea, flexibility is the critical element of effective force projection. The most likely options to be exercised are armed boarding and the proverbial 'shot across the bow' with a naval gun. These are the most basic requirements for interdiction. To meet the broad spectrum of tasks associated with the maritime security these vessels could utilize modular payloads. Modular vessels could be adopted for a number of threats including nuclear, biological and chemical hazards as well as environmental response and immigration enforcement. Such vessels could even be fitted for (not necessarily with) Anti-ship Missiles (ASM), Surface to Air Missiles (SAM), Point Defence and the other weapons and systems typical of a modern surface combatant. This will give the broadest range of response capabilities to meet the ever changing security concerns we presently face.

Interoperability

A great deal of naval resources go into support for OGDs, Other Government Departments. This support currently ties up two frigates for up to 290 days (increasing from 150 days last year). As Oceans Management becomes more complex and the threats continue to increase in challenge, this trend will likely continue. A corvette built with a modular design would ease the pressure of our large surface combatant fleet and also give rise to new opportunities for cooperation between government departments. Such vessels would create the possibility to man joint crews and payloads for particular operations. For example, a corvette tasked to a fisheries patrol could be loaded with a Department of Fisheries and Oceans (DFO) payload and enforcement officers prior to sailing.

Efficiency

The use of advanced hull forms, propulsion systems and automation can greatly reduce the operational costs and manpower required for such vessels. A Canadian Patrol Frigate deploys with 235 personnel. Most modern corvettes deploy with 30 to 80 personnel on board, and the next generation of vessels will be able to reduce this number even further.

As an example, the US Navy's DD(X) Destroyer Project specification capped personnel at no more than 95, a major reduction from the 346 personnel required to man the Arleigh Burke-Class vessels it will replace. In addition to reducing the number of sailors put in harm's way, such advances reduce an array of costs, such as salary and pensions, training, accommodations, rations, and fuel.

Overall

Examining these requirements in conjunction with present and planned designs for corvettes and offshore patrol vessels of other nations demonstrates a clear opportunity for the Canadian government to address our capability gap in this area of maritime security. Smaller and less expensive than frigates, a modern corvette design could deliver an array of capabilities, not just to the Navy but to the other government departments they support.

In the Canadian context, additional design consideration should be given to the ability to support the various helicopters used by the Canadian Forces and Canadian Coast Guard, especially the new CH-148 Cyclone. A Canadian design must be capable of riding out North Atlantic storms and venturing into the Arctic. These vessels would require a modular approach to carry mixed crews and cargos based on the wide-array of tasks they would be expected to perform.

Finally, it is important to emphasize that these vessels would exist to augment our larger warships, not replace them. Canada will still need its larger vessels for Defence and Foreign Policy roles. However, a new corvette or off shore patrol vessel could address the current capability gaps in our government fleets and provide an ideal tool for protecting our ocean domain. FL

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