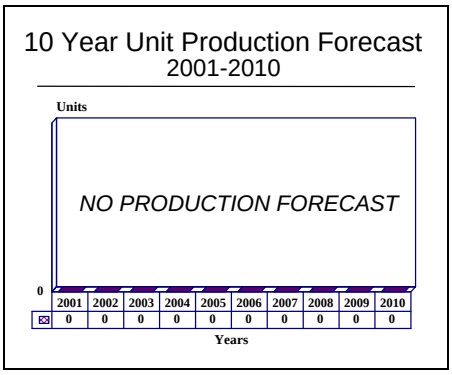
Kingston Class MCDV – Archived 11/2002

Outlook

- Service life may be curtailed due to budget pressures
- Higher priority programs preempting resources for this class
- Some of class may be offered for sale to non-military agencies
- No foreseeable export market likely to develop
- Report will be archived next year



Orientation

Description. Multipurpose offshore patrol and route surveillance mine countermeasures vessel, intended to combine the roles of offshore patrol vessel, training ship and route surveillance and mine clearance (MCM) in one platform.

Sponsor

Canadian Department of National Defense
Minister of Supply and Services
Place du Portage
Hull PQ
Ontario K1A 055
Canada

Contractors

Fenco McLaren Inc
Willowdale, Ontario
Canada
(Prime contractor; mechanical minesweeper systems and an Integrated Survey and Inspection System)

SNC Group
Montreal, Quebec
Canada
(Consortium leader)

German Marine Inc
Dartmouth, Nova Scotia
Canada
(Ship and marine systems design)

Halifax-Dartmouth Industries
Halifax, British Colombia
Canada
(Ship design and construction, main shipyard)

MacDonald Dettwiler & Associates
Richmond, British Colombia
Canada
(Combat systems integration and logistics support)

Thales Systems Canada
(formerly Thomson-CSF Systems Canada)
Nepean, Ontario
Canada
(Integrated logistics management and combat systems support)

Eduplus Management Group
Canada
(Training development)

Licensees. No production licenses have been granted.

Status. In service.

Total Produced. 12

Pennant List

Name	Builder	Launch Date	Commission Date
700 *Kingston*	Halifax Shipyards	8/1995	9/1996
701 *Glace Bay*	Halifax Shipyards	1/1996	10/1996
702 *Nanaimo*	Halifax Shipyards	3/1996	5/1997
703 *Edmonton*	Halifax Shipyards	7/1996	7/1997
704 *Shawninigan*	Halifax Shipyards	11/1996	8/1997
705 *Whitehorse*	Halifax Shipyards	2/1997	10/1997
706 *Yellowknife*	Halifax Shipyards	6/1997	11/1997
707 *Goose Bay*	Halifax Shipyards	10/1997	4/1998
708 *Moncton*	Halifax Shipyards	1/1998	6/1998
709 *Saskatoon*	Halifax Shipyards	5/1998	9/1998
710 *Brandon*	Halifax Shipyards	8/1998	2/1999
711 *Summerside*	Halifax Shipyards	12/1998	7/1999

Mission. The Kingston class ships are used for a multitude of missions, including coastal surveillance, encompassing 18-day mission patrols and assistance to other government departments; naval reserve force training in all disciplines and in all regions of the country; and mine countermeasures for route survey, minesweeping and mine inspection operations.

The vessels are capable of carrying out operations worldwide, even in harsh climate conditions, using high reliability, proven equipment and systems with built-in redundancy. Six ships will be operating in areas on the Atlantic east coast, including the St. Lawrence River, and six on the Pacific coast of Canada.

Price Range. Based on the total contract value, the unit price was about US$45 million each in 1992-93 dollars.

Technical Data

Performance		
Speed (max)	15 kt (in Sea State 2)	
Speed (coastal surveillance)	10 kt	
Speed (mechanical sweeping)	8-10 kt	
Range	5,000 nm at 8 kt	
Seakeeping	Up to Sea State 5	
Crew	7 officers, 29 n/c and petty officers	
	Metric	**Standard**
Dimensions		
Length, overall	55.3 m	181.4 ft
Beam	11.3 m	37.1 ft
Draft	3.4 m	11.2 ft
Depth to Main Deck at Center	5 m	17 ft
Depth to Lower Deck	2 m	6.5 ft
Displacement	934 tonnes	962 tons (full load)
	Type	**Quantity**
Armament		
Guns	Bofors 40 mm/L60 Mark 5C	1
	12.7 mm Browning M-2HB MG	2
Electronics		
Radar		
E/F-band and I/J-band (search)	Kelvin Hughes 6000	1
Sonar	High frequency active; minehunting	2

Electronics (continued)

	Type	Quantity
Towed sidescan	MacDonald Dettwiler	1
Communications	HF transmitters	2
	HF receivers	4
	UHF transceivers	2
	VHF mobile transceiver/dir. finder	1
Navigation	Loran C and DGPS	
Propulsion		
Diesels	Wärtsilä UD 23V12	4x2,450 shp
Electric	Jeumont CI 560L	2x1,500 shp
Alternators	Jeumont ANR-53-50	4x1.8 MW
Propellers	LIPS Azimuth thrusters (Z-drive)	2

Design Features. The Kingston class MCDV is derived from an offshore supply vessel design and thus shares the ancestry of the British River class MCMVs. The hull is a longitudinally framed, broad structure with a 3/4-length forecastle, and has been designed to minimize the mild steel's weight. The design was based on a hard chine hull form, using a form that drops to a fantail cleared for mine warfare equipment handling. The bows are moderately raked but the design has little sheer and the flare is not pronounced. The superstructure consists of a single large block midships with the bridge forming the topmost of the three decks. Glass areas are extensive, providing 360-degree vision. A single plated mast is stepped in the center of the superstructure.

The vessels are also capable of carrying 20-foot standard containers on their open deck aft. The decks are fitted with the necessary power cables ready to install the containers, which are mission-specific operational payloads. The first payload allows the ship to construct a detailed map of the ocean floor; the second consists of the Bottom Object Inspection Vehicle (BOIV), a remotely operated submersible with cameras; and the third is a mechanical minesweeping payload against underwater threats.

The construction involved initial production of partially outfitted steel block units, which were assembled into blocks and then integrated into the ship. The decks were assembled upside down in order to pre-outfit the undersides prior to installing them on the ship.

Two funnels are mounted side by side, with their outer sides flush with the hull surface. The sheltered area between them is used to handle the sidescan sonar towed body. A single 40 mm gun is mounted forward of the bridge with a helicopter vertical replenishment area in the bows.

Internally, the ship is built to a very high standard, with crew accommodation being unusually spacious for a ship of this size. The total number of berths is 36, for seven officers, 11 chiefs and petty officers and 18 non-commissioned members, with a maximum of three crew members in each cabin. The crew concept is based upon a core crew who operate the ship and run its basic functions. This core crew is then augmented by teams of specialists who are assigned to the ships on an as-needed basis.

The ship's radar system consists of a Kelvin Hughes I-band navigation radar and a GPS (Global Positioning System). The surface search radar is the E/F-band Kelvin Hughes 6000. The degaussing system consists of a masthead magnetometer, which controls the output of the system's power units and the signature; four horizontal M coils; eight vertical L coils; and five vertical athwartships A coils.

Propulsion is provided by four main Wärtsilä UD 23V12 diesel motors and four alternators and two Jeumont electric motors (600 V DC). The two LIPS Z drive azimuth thrusters are fitted with fixed pitch reversing propellers. The propulsion system is equipped with a central control and monitoring system. One floor-standing main control console is installed in the bridge along with two desktop bridge-wing control stations.

In compliance with the Canada Shipping Act: Great Lakes Pollution Prevention Regulations, the ship maintains zero waste discharge levels through the use of holding tanks. The environmental systems installed on the Kingston class include treated black water, treated gray water, separated oily water and a garbage compactor.

Operational Characteristics. Mine warfare capability is provided by three alternate modular payloads. These are: a deep mechanical minesweeping system (MMS), similar to the UK Royal Navy Explosive Deep Armed Team Sweep; a route survey package (RSP), based on a Bendix AQS-17(V) towed sonar; and a mine inspection package (MIP), using a SUTEC Double Eagle unmanned underwater vehicle. A total of four MMSs,

two RSPs and a single MIP are needed to form a pool for issue to the MCDV fleet as required.

The degaussing system from Power Magnetics and Electronic Systems of Rugely, Staffordshire (previously Thorn Automation) provides three-dimensional control of the magnetic signatures. The size, arrangement, and location of the degaussing coils are based on finite element modeling of the ship structure and major equipment fits.

The main gun armament of the ships is a Bofors 40 mm L60 Mark 5c mount. This is a twin, 20 mm Oerlikon mount equipped with a single 40 mm Bofors gun. The mounts used for the Kingston class were originally deployed on River class frigates in 1944. They were transferred to the aircraft carrier HMCS *Bonaventure* until it was decommissioned in 1972. After being refurbished, the mounts were then issued to the Canadian Army for airfield defense in Europe, before being transferred back to the Navy for the MCDV program.

The propulsion system provides 15 knots maximum continuous speed. Under economical cruising speed of 9 knots and using two engines, the range is 5,000 nautical miles with a 20 percent margin in tank capacity. Mechanical minesweeping is carried out at 8 knots.

The crash-stop length from a speed of 15 knots is five ship lengths. The tactical diameter/length ratio of less than 2.8 is indicative of the turning capability of the ships.

Variants/Upgrades

This class has no variants and has not been upgraded.

Program Review

Background. The requirement for the MCDV stemmed from the 1987 Canadian White Paper on Defence, which switched the role of the Canadian Primary Navy Reserve from general fleet duties to a combination of coastal patrol and mine countermeasures. The initial consequence of this realignment was the formation of the Maritime Coastal Defense Organization (MCDO). The ships available to the MCDO were quite unsuited to the roles demanded of them, and a replacement program was required.

Three years earlier, the Canadian Navy had formed a planning group to study the mine warfare and countermeasures areas. This group, the Minor War Vessel Acquisition Program (MWVAP), had formulated requirements for two classes of MCMV, the first being a harbor and coastal defense ship assigned to inshore duties and basic training tasks, and the second a deep-water MCMV. These requirements had been completed by 1985 but remained a paper study due to a lack of financial backing.

The MCDO had inherited the MWVAP studies, and it was obvious that the proposals met the MCDO requirements. A plan to construct a total of 30 such ships was proposed, with 18 being the small, inshore type and 12 larger ones intended for deep-water use. However, by 1988, financial constraints had forced the abandonment of the smaller class, and attention shifted to the larger design. This, the MCDO decided, would be built to mercantile standards using mild steel. The justification for this design was that standoff mine warfare technology meant that the ships would not have to approach a minefield and would therefore not require exotic hull construction materials or elaborate signature reduction technology.

The go-ahead project definition of the new design was given in April 1988, with the necessary contracts being awarded to CSE and to Fenco McLaren in June 1989. Severe capital shortages resulted in delays in the final construction contract, which was ultimately awarded to Fenco McLaren in October 1991. Major problems were then encountered when the Canadian government demanded a US$75 million performance bond from the winning consortium. The consortium's request to the provincial government for assistance was refused, and the matter remains under negotiation. The first of the 12 MCDV class ships was launched in July 1994 and began trials in November 1995. In early 1995, the names of the classes were changed from honoring prominent individuals to reflecting the names of maritime cities or towns.

The ships entered service at a rate of three per year, with the last being delivered in July 1999. Early trials revealed that the ships suffered from topweight problems and listed by about two degrees in light ship condition (934 tonnes). This was corrected by removing some non-structural steel plate from the bridge and adding 9 tonnes of ballast. A more interesting problem was encountered later when the ships' machinery showed a tendency to stop working for no apparent reason. The fault was eventually traced

to an electrical problem in the AC-to-DC power conversion system and poor connections in the wiring circuits.

By mid-2000, additional cuts in Canadian defense expenditure were being considered, and the adoption of a tiered readiness system had been proposed. Under this system, four of the 12 Kingstons would be rated as high-readiness, undertaking some 120 days at sea per year. Six more would be held at standard readiness, undertaking 80 days of sea duty per year and being prepared for operational deployment at 90 days' notice. The remaining two members of the class would either be transferred to the Department of Fisheries or kept at extended readiness, requiring 180 days' notice before being available for deployment.

Effective mid-2001, all 12 Kingston class MCDVs were retained on the Canadian Navy active list. However, the class is under sustained pressure and it appears probable that a number of the ships will be transferred into the reserves or sold.

Funding

The Kingston class is funded by the Canadian Ministry of Defence for the Royal Canadian Navy.

Recent Contracts

Contractor	Award ($ millions)	Date/Description
CSE	3.5	June 1989 – PD contract.
Fenco McLaren	3.5	June 1989 – PD contract.
Fenco McLaren	473	October 1991 – Prime contract for the design, construction and outfitting of 12 Kingston class MCDVs.
Halifax Dartmouth Industries	261	1991 – A Fenco McLaren subcontract to build the 12 ships.
Indal Technologies	3	April 1993 – A Thomson-CSF subcontract for the design and manufacture of four modular minesweeping systems.
Thomson-CSF Systems Canada (now Thales Systems Canada)	41.3	Subcontract for the provision of the ships' weapons, minesweeping systems and all above-water mission electronics, as well as integrated logistics support.

Timetable

Month	Year	Major Development
	1984	Original MWVAP reports
	1987	MCDO founded
Apr	1988	MCDV program go-ahead given
Jun	1989	Project definition contracts awarded
Oct	1991	Construction contract awarded
Dec	1993	Ship Critical Design Review
Dec	1994	Keel laid for the first ship of class
Aug	1995	First of class launched
Sep	1996	HMS *Kingston* enters service
Jul	1999	Last ship commissioned

Worldwide Distribution

Canada. 12

Forecast Rationale

The Kingston class represented a sensible approach to providing a coastal patrol capability for the Canadian Navy. They are flexible and inexpensive ships that can perform many of the roles demanded of such vessels. The problem is that in an environment where there is no discernible threat to the Canadian mainland and the defense budget is under extreme pressure, these ships rate only a low priority.

They have been doubly unfortunate in that they developed a series of problems that required fixing just as the Canadian Navy managed to finally acquire its long-sought-after submarines. The cost of bringing these submarines into service was significantly higher than projected, with the result that the Canadian Navy has been alert to every possibility of effecting economies. The Kingston class are a natural and vulnerable target.

Had an export market developed for these ships, they may have achieved a more secure standing, but efforts to export the class never enjoyed any success, or generated any openly discernible signs of interest. The real problem is that the concept represents such a simple and economical approach to designing a fleet auxiliary that it makes more economic and political sense to build the ships locally, using a fishing trawler or offshore supply ship hull as a base.

For these reasons, further activity in the Kingston class seems highly improbable. This report will be archived next year.

Ten-Year Outlook

No new production is projected, and modernization and upgrade activity is likely to be of very limited scale during the forecast period. Therefore, the forecast chart has been omitted.

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