

# Canada's high flyer — the world's fastest warship

**D**uring sea trials in April, 1969, the 151ft HMCS *Bras d'Or* rose up on her hydrofoils for the first time and powered over the seas off Halifax Harbour at more than 60kts. The ship's designers and builders were beside themselves with elation. They knew they had just launched the fastest warship in the world. Their 180t hydrofoil prototype FHE 400 (Fast Hydrofoil Escort) was easily capable of outrunning every nuclear submarine in the world.

Unfortunately, the *Bras d'Or's* promise was not to be realised. Instead it was destined to suffer a fate similar to the Canadian Air Force's delta-wing fighter *Arrow*. And while the story of the *Avro Arrow* has received a lot of attention in recent years (including a 1997 made-for-TV movie) the story of what might have become the world's fastest and deadliest submarine hunter remains largely unknown.

Today the ageing, aluminum *Bras d'Or* sits perched on her foils, on display at the Maritime Museum of Quebec at Islet sur Mer. The *Bras d'Or's* Paxman diesel engine lies in storage nearby at the Cummins Diesel yard in Montreal, but some members of the Canadian Institute of Marine Engineering (CIMarE) would like to change that, giving at least the power plant from the ship some of the national recognition it deserves.

The *Bras d'Or's* engine, like the sub-hunter herself, was an advanced state-of-the-art design for its day. The Paxman had its problems during sea trials — governor malfunctions, oil leaks and a control system failure — but as is frequently the case with new technology, accumulated operational experience would probably have ironed out these glitches. Still, the CIMarE group considers the engine a fascinating piece of Canada's naval and maritime heritage and is attempting to preserve it as such. They hope to raise sufficient funds to create an endowment so the engine can be placed on permanent display at a museum.

**Rick James** describes the history of this fascinating, yet ultimately unsuccessful vessel which had unparalleled performance for a waterborne craft

## Advanced technology

The 2000bhp Paxman provided initial power to drive the *Bras d'Or* hull-borne at lower speeds. It enabled the ship to handle 12ft seas as readily as a destroyer and the hydrofoils, when below the sea surface in this mode, provided increased stability.

Once the ship reached 23kts, the foils lifted the hull clear of the water and an aircraft-derivative, 21 500shp, Pratt and Whitney FT4A-2 gas turbine took over as the main propulsion engine. This drove through General Electric gearboxes to a pair of three-bladed supercavitating propellers. Then the FHE 400 hit its 'jump speed', flying along clear of the ocean's surface at a breathtaking 63kts, in up to 4ft seas; above those wave heights the throttle was eased off to a relatively sedate 45kts. The *Bras d'Or* literally ran rings around the destroyer HMCS *Saguenay*.

The primary contractor for the Fast Hydrofoil Escort project was De Havilland Aircraft of Canada. Assembly of the ship took place at the Marine Industries Ltd shipyard at Sorel, PQ. The FHE was the first Canadian warship constructed upside down. Marine Industries already had a good reputation for aluminium welding and fabrication after delivery of the *St. Laurent* class destroyer escorts.

## Initial success, ultimate cancellation

At the height of the Cold War, when the disturbing submerged speeds of nuclear submarines (sometimes reported to have



The *Bras D'Or*, foil borne and at high speed

been 45kt plus, *Ed*) called for drastic defensive measures, the imaginative engineering and innovative design of the Fast Hydrofoil Escort appeared to be the solution. Unfortunately, a combination of engineering glitches and cost over-runs, in combination with an accidental fire onboard the ship, put the government of the day on the defensive over the high-profile project. In 1971, the 'plug' was pulled on the world's only ultra-high-speed, open-ocean warship, and a year later the *Bras d'Or* was decommissioned.

It is worth mentioning that the Air Force's Arrow project cost some C\$400M by the time it was jettisoned in 1959, the Fast Hydrofoil Escort project was terminated after expenditures of C\$53M. As Commander Tony German, a Canadian Navy historian, noted the government 'simply refused to put good money after good.'

### The Paxman involvement

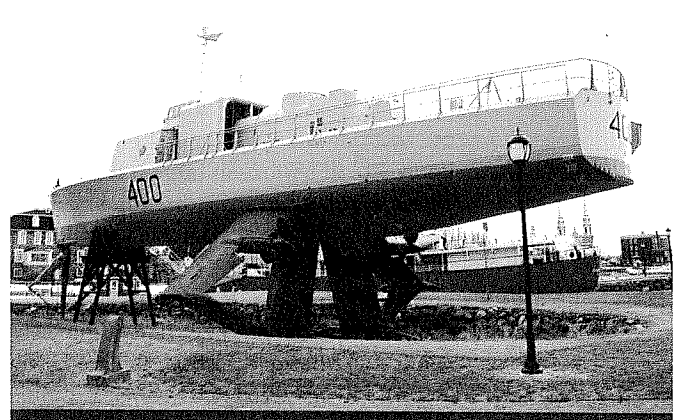
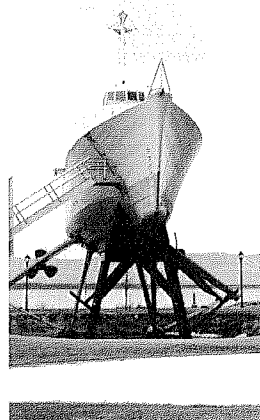
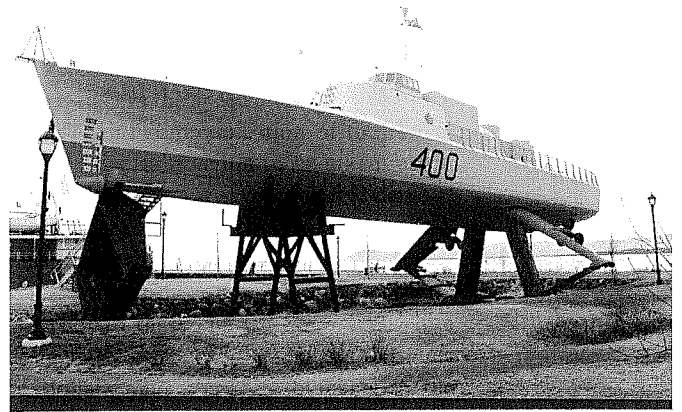
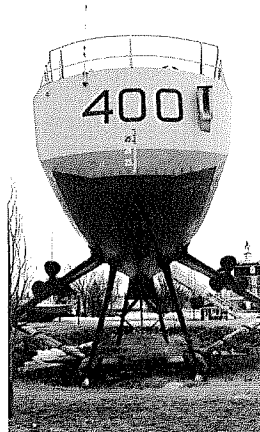
The *Bras d'Or* propulsion system included a Paxman Marine Ventura 16 YJCM diesel. The four-stroke turbo-charged engine has 16 cylinders in 'V' formation with air-motor start. The bore is 197mm with a stroke of 216mm and a design output of 2000bhp (1500kW) at 1600rev/min). The engine drove two 2.12m diameter, three-bladed, controllable pitch propellers in the rear foil struts via a dual-output gearbox, down-shafts and an out-board gearbox. When foil-borne the diesel driven propellers were clear of the water but were feathered to minimise wave-impact loads.

Just how did the *Bras d'Or*'s Paxman diesel make its circuitous way to the Cummins yard in Montreal, over 30 years after the ship was moth-balled? When the FHE project ended the engine was turned over to Crown Assets which sold it to the GEC Diesel Co. GEC then gave it to the Canadian Institute of Marine Engineering which subsequently donated it to St. Lawrence College in Cornwall, Ontario, where it was used as an instruction tool for marine engineer training. When that programme ended the engine was returned to CIMarE and stored in the Cummins yard.

Ideally the CIMarE engineers would like to see the Paxman engine displayed alongside the *Bras d'Or* at the Maritime Museum of Quebec but the museum has declined the opportunity in the face of funding constraints. As a result, CIMarE is now attempting to raise awareness of the

### PRINCIPAL PARTICULARS

Displacement	180t full load
Length	151ft (46.0m)
Beam	21ft (6.4m)
Depth	23ft (7.0m)
Propulsion	foil borne 1 P&W FT4A-2 turbine, 21 000shp, 63+ kts hull borne 1 Davey Paxman Ventura diesel, 2000bhp, 15kts.
Crew	20



Various views of the *Bras D'Or* on display at the Maritime Museum of Quebec at Islet sur Mer, and showing the configuration of foils and propellers for both diesel and gas turbine drive

Credit: Antoine Lenormand

project and create an endowment to preserve and display the engine.

'Champion' of the Paxman project is Brian Keefe from the Ottawa Branch, assisted by keen CIMarE branch members from across the country: Brenda Spence, Montreal; Gernot Seebacher, Montreal; Pierre Boisclair, Montreal; Don Levy, Halifax; Dave Simpson, Vancouver, and; Ross Somerville, Vancouver.

To find out more about the CIMarE Paxman project contact Brenda Spence at the CIMarE National Office, 1925 52nd Ave, Lachine, Quebec H8T 2C3.

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