

HOVERING OVER THE ARCTIC

MAIN The nimble, shipborne Eurocopter Bo.105 supports projects throughout the Canadian Arctic every year.

Simon Belt/ArcticNet Photo

BELOW It's in the Arctic where the Bo.105 shines. **Alexandre Forest/ArcticNet Photo**

COME TAKE A RIDE WITH THE CANADIAN COAST GUARD AS THEY PROVIDE VITAL AND LIFESAVING SERVICES IN CANADA'S WESTERN ARCTIC WATERS WITH A TRUSTY OLD EUROCOPTER BO.105.

by Eric W. Manchester

A Eurocopter Bo.105 from Victoria, B.C., frequently goes to sea aboard the icebreaker Canadian Coast Guard Ship (CCGS) Sir Wilfrid Laurier. The highlight of that little machine's seagoing year is an annual northward migration to spend its summer toiling in Canada's Arctic.

CCGS Sir Wilfrid Laurier, which is based at Victoria, patrols the western Arctic from July through October every year, covering some 15,000 nautical miles. Several other Canadian Coast Guard icebreakers, based on the Atlantic coast, also patrol the Arctic during the short navigation season, and each carries a Bo.105. Nationwide, CCG helicopters are a collaboration of federal government agencies. The machines are owned by the Department of Fisheries and Oceans, while the pilots and engineers are provided by Transport Canada.

Operating from its land base, or Laurier's tiny aft flight deck, the 105 supports diverse projects along British Columbia's extensive coast. Over southern home waters, the helicopter's primary duties include resupply and maintenance of light stations and mountaintop repeater stations, pollution surveillance, and fisheries conservation and enforcement.

Search and rescue is a secondary role, because military aircraft are the chief SAR responders in Canada, nevertheless, about 30 such missions are flown each year.

It is in the land of the midnight sun where the 105's stock really soars. In the Arctic, its countless sorties off Laurier's stern include: hauling crews and materials to remote sites; supporting the many scientific research teams that share Laurier's laboratory spaces; scouting navigational options when operating in ice-infested waters; flying SAR missions and medevacs where other help is scant; and aiding local police and other authorities.

Without the helicopter, most of the Arctic work can't happen. There are no ship-sized docks, and it's impractical to get crews and equipment ashore by small boat. Most of the featureless, gravel-rock islands barely show above sea level. The water is so shallow that you'd have to get out of the boat and wade in — which wouldn't be healthy or pleasant. "The machine is a valuable extension of the ship," said seasoned pilot Glenn Diachuk, during a recent Arctic tour (his fourth).





THE ICEBREAKER

The 272-foot Laurier, named for a famous Canadian prime minister, is a light icebreaker and navaid tender. The 22 year-old ship has three 16-cylinder diesel engines that produce 7,600 horsepower, which, when converted through two electric propulsion motors, results in 15-knot speeds. When this power is applied to Laurier's 3,800 registered tons, three-foot thick ice is dispersed at five-knot speeds. Depending on conditions, Laurier can even defeat ice almost 10 feet thick.

The ship's complement of up to 50 officers, crew and scientists work 12-hour shifts, seven days per week, around the clock. Two complete crews

share Laurier, changing every six weeks during Arctic patrols. Most of the researchers hail from universities and agencies in Canada, Japan and the United States. Laurier's helicopter contingent comprises just one pilot and one engineer for each crew rotation.

Besides being a Canadian sovereignty presence in the Arctic and hosting myriad science projects, the ship's own coast guard work is intense. Laurier services hundreds of navigation aids and beacons. During most summers, icebreaking is a life-sustaining task. The ship opens passages for tugs and barges hauling supplies to remote villages and other isolated sites in the North. These supplies, everything from canned goods to new

houses and fuel, are essential to survival during the winter months. Laurier's escort services were not needed during 2007, though, as that summer had the least amount of sea ice on record.

THE HELICOPTER

For its 2007 Arctic patrol, Laurier carried helicopter CG 362, a 1985-vintage Eurocopter, powered by twin 840-horsepower Rolls-Royce engines. "They're one of the best turboshaft engines going," said veteran helicopter engineer Andy Graham, who was on his 15th Arctic tour during 2007. "They've been around a long time and are very reliable." The 105 can lift nearly a ton, externally or inside. Cruising speed is around

OPPOSITE LEFT Alana Swain clears the Bo.105 from the deck of CCGS Laurier. **Eric Manchester Photos**

OPPOSITE RIGHT The helicopter is used to transport people for beacon maintenance on remote outcrops.

OPPOSITE BOTTOM LEFT Cathy Robertson Laurier's flight deck next to CG 362.

OPPOSITE BOTTOM CENTER Transport Canada pilot Glenn Diachuk feels the Bo.105 is well-suited for its shipborne role.

OPPOSITE BOTTOM RIGHT Diachuk watches the load below his Bo.105 being set on the deck.

BELOW This is Andy Graham's 15th tour.

BELOW CENTER The retractable hangar on board Laurier provides little room for the Bo.105. Now imagine being the AME working on it in heavy seas!

BELOW RIGHT Eric Melkle uses the electric-hydraulic trolley to move the Bo.105 into its hangar.

BOTTOM Martin Fortier/ArccticNet Photo

120 knots, carrying four passengers plus pilot. The machine has inflatable flotation gear in case of emergency water landings. It can operate from Laurier's flight deck in up to 10-foot seas and winds to 40 knots.

The Bo.105 is highly responsive and particularly suited for its shipborne role stated Diachuk. "It has the strongest landing gear of any helicopter, which is especially important for rough-seas landings on a heaving flight deck. And, the cargo compartment is phenomenal in its amount of space and weight capacity." Few small helicopters can carry full sheets of plywood in their trunk.

Seeing how tiny Laurier's flight deck looks on approach, and realizing that it's moving away at 11 knots, the machine's sports-car nimbleness is really appreciated. Just behind the ship's retract-

able hangar, the airflow changes and sucks the aircraft down, which means you reach a point where you're landing — like it or not. "We try to keep an option to overshoot at the last minute — better to go into the sea than crash on deck," said Diachuk.

WEATHER, MAINTENANCE AND OTHER CHALLENGES

The biggest challenges facing flyers in the remote Arctic are the scarcity of landmarks, lack of support resources and meager weather information, according to Diachuk. "It's just you and the ship, strictly VFR [visual flight rules] getting on and off. You really have to keep an eye on the weather, it can change fast and get nasty." Icing is a concern around the engine intakes and on the





ABOVE Seeing how tiny Laurier's flight deck looks on approach, the Bo.105's sports-car nimbleness is appreciated by its pilots.
CCG Photo

ABOVE RIGHT The crew's baggage is put into cargo nets to be flown back to shore during crew rotation.
Eric Manchester Photos

RIGHT The Bo.105's bubble windows provide for an excellent field of view.
CCG Photo

rotors in particular. Since the rotors lack de-icing capability, there are few options if it appears. "We either turn around, change altitude or land." Once airborne, except for the aid of an automatic direction finder (ADF, which is good to 50 miles), distance measuring equipment (DME, good to 15 miles) and two GPS units, pilots are mostly on their own in Arctic skies.

"The GPS is flawless, almost amazing," said Diachuk. "It's reassuring to know that it works so well. Night flying is possible, but the weather must be really good."

The Bo.105 requires about two hours of maintenance for every one hour of flying. If Murphy's Law is suspended, and the Gods of Moving Parts are in good humor, the solitary engineer tending to the 105 during its Arctic patrol might enjoy a pleasant northern cruise. But, it doesn't take much to turn a six-week rotation into an eternity



of misery, made all the more intolerable by the complete lack of maintenance facilities anywhere nearby, and the fact that getting parts is a major undertaking.

The machine's biggest nemesis during Arctic operations is saltwater corrosion, despite the climate there being a desert. Even relatively calm days can stir up saline-rich moisture that invades its workings. Heavy rain and sleet during flight can injure a rotor's leading edge. In addi-

tion, according to Graham, intakes and rotors get damaged from the sand and gravel that comprise most of the islands which the 105 frequents. Said Graham, "Even with thorough daily cleaning, some bits still get through the particle separator to the engine." Overall, the colder Arctic temperatures tend to affect the transmission more than the engines.

While the 2007 patrol was relatively problem-free maintenance-wise, in previous years rotors

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and a transmission had to be replaced while onboard the ship. Considering that replacing a Bo.105's transmission usually takes two engineers some 60 hours in a roomy, well-equipped shop, it was a daunting task for the poor sod who was alone in the ship's cramped, cold and dimly lit hangar — which was often moving in multiple directions.

Weather regularly challenged flight ops during the 2007 patrol. Wind and fog, often at the same time, dominated an array of conditions that repeatedly interrupted Laurier's critical work. For nearly four months, around the clock, the wind continuously blew at more than 20 knots, was frequently in the 30-knot range and had gusts of up to 40 and 50 knots. Plagues of fog, in sluggish

banks and speedy veils, smothered Laurier in spite of the wind. The summer weather included below-freezing temperatures, fast-moving rain-sleet squalls, snow, some clear skies and just enough brilliant sunshine to keep hope alive.

During one cruel fog delay, the helicopter and shore party sat stranded just four miles from the ship until a radar-assisted boat could retrieve them. The helicopter looked destined to spend the night on a cold gravel bed. Except for being lonely, the aircraft was unlikely to suffer damage at that locale, although curious bears and musk oxen were of concern at other places. Fortunately, the fog retreated after supper and the pilot got his second boat ride of the day, to go and fetch the helicopter.

While heading home across the north corner of the Pacific Ocean at the patrol's end, Laurier was pummeled by 33-foot swells and 75-knot winds. Despite the thrashing, the 105 remained securely tethered inside its cocoon-like hangar on Laurier's pitching hindquarters.

ALWAYS AT THE READY

If variety is the spice of life, then CG 362 had a zesty summer in the Canadian Arctic. Besides the endless loads of crew and materials ferried to countless beacon sites, the aircraft's routine was punctuated by flights of mercy, law enforcement and Good Samaritanism — all with happy endings, in contrast to some past years in which people vanished into the frigid vastness, never to be found.

At Gjoa Haven, Laurier's helicopter flew three sorties to retrieve hunting parties 40 miles away that had called for assistance. They claimed to be stranded and running out of food and fuel. In reality, it seemed more like they just wanted a helicopter ride back to town. False alarms are a routine component of Coast Guard business. Considering the possible consequences, all calls for help get a response.

Near Cambridge Bay, CG 362 transported local RCMP officers (who were armed and armored, while the helicopter and pilot were neither), to search for crewmembers of a Norwegian-flagged sailboat. Both boat and crew were illegally in Canadian waters. An aerial search of a remote shore ended peacefully with the apprehension of two suspects, who then joined their shipmates in jail, awaiting their court appearance and deportation.

Without Laurier's Bo.105, the RCMP would have had a long wait for air resources from Resolute, Nunavut, or Yellowknife, N.W.T., or would have had to rely on a chance aircraft being available when they needed it. Otherwise, their search would have been conducted via small boat. This was a joint operation involving Canada Border Services Agency, Royal Canadian Mounted Police and Canadian Coast Guard. The three-agency collaboration was possible because Laurier (and its helicopter) was in the general vicinity and went out of its way to assist.

In Franklin Bay, on Canada's mainland shore facing the Beaufort Sea, CG 362's pilot drew on prior heli-logging experience to help retrieve a small boat from its hang-up on a beach. The 105 hooked the boat's towing eye and skidded it into deeper water so the owner could recover it.

While in the Beaufort Sea, tasking from the Joint Rescue Coordination Centre (JRCC) in Trenton, Ont., vividly illustrated the dearth of SAR resources in the Arctic. Someone alone in a

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ABOVE The Laurier is usually tasked with breaking through three-foot thick ice, but, under the right conditions, it can plow through ice almost ten feet thick.

Marc Tawil/ArcticNet Photo

RIGHT In the right conditions, shipborne night operations will be conducted.

Eric Manchester Photo

BELOW Operating a small helicopter, like the Bo.105, in the Canadian Arctic is a mission of confidence, and holds possibilities for both reward and punishment.


Myriam Gauthier/ArcticNet Photo



14-foot open boat was missing on the Mackenzie River, and the JRCC wanted CG 362 to search for them. Otherwise, a Hercules would have to fly up from Trenton to have a look. Laurier had to steam 200 miles to put the 105 within flying range of the search area. Trouble was the helicopter was heading toward a refueling conundrum that could result in the aircraft flying endless circuits of taking on fuel just so it could get back for more, without accomplishing much in the search area. Fortunately, the boater turned up safe before the 105 launched, so the false alarm only cost Laurier several hours of steaming in a circle.

About 80 per cent of overdue boat incidents turn out to be false alarms, but it's the other 20 per cent that ensured there was no hesitation in responding to that call.

There was one frenzied Arctic mission flown by the 105 for which all hands aboard Laurier were grateful. On crew-change day, mounds of luggage in cargo nets littered the flight deck, ready to be slung ashore. When crew change began in earnest, which to the casual observer might appear chaotic, there was carefully choreographed method in the apparent madness. Firstly, the Eurocopter transported deckhands and an officer to a staging area ashore. Then, continuous waves of crew, four at a time, lifted off Laurier to the staging area, interspersed with jam-packed cargo nets. When the incoming crew was ready, the helicopter flew loaded both ways between ship and shore, until each crew was standing on its respective side of Laurier's work schedule.

Canada's Arctic is a complex mix of stark beauty and lethal conditions, in a vulnerable environment. It's inhabited by people and wildlife whose rugged lives are unknown to most folks in the lower latitudes. Operating a small helicopter off a tiny flight deck here is a mission of confidence, and holds both reward and punishment for the lone pilot and solo engineer. Each works at their everyday jobs as free and independently as any employee can imagine, yet they're burdened with huge responsibilities to be intensely focused and hugely self-reliant. From the pilot's perspective, according to Diachuk, "It's fun to fly here. You never know what you're going to face." But, that just might be the engineer's worst fear! 

Eric W. Manchester is a Victoria-based writer, photographer and single-handed sailor. He spent much of his army paratrooper youth being shaken (not stirred) in numerous camouflaged helicopters, many of which were aloft when he was ordered to exit. He can be reached at eric@ewmanchester.com.

