

ICE PATROL

Late in the Twentieth Century

Dedicated Canadians Kept Watch on North America's Offshore Ice

By Bill Althoff

Chance – call it luck – is always a factor in love, in business and in war. Just ask any soldier, airman or naval officer. Sometimes, fortune proffers the unexpected. If one is wise, such moments are savored for what they are: a delicious spice to the everyday of life-experience.

Three decades ago, for a few, fantastical days, this author was granted an experience wholly alien to the average American – most of whom reside comfortably enough in a reasonably temperate (more or less) swath of this two-nation continent called North America.

To be candid – I'm no airman. I am, however, a geologist and deeply curious researcher: naval aeronautics, the history of science; polar memoirs. By 1988, the "next" project was underway. Thirty years before, a United States Navy non-rigid airship (blimp) had penetrated the Canadian Arctic. Its orders: rendezvous with base BRAVO riding T-3 – an "ice island" adrift in the Arctic Ocean. Then positioned 800 or so miles off 90° North Latitude – the north geographic pole.¹ Sponsored by the Office of Naval Research, the mission would assess the platform for support of science in the Northlands – and perhaps contribute to the International Geophysical Year (IGY) of 1957-58.

En route T-3 that IGY August, the airship would log the Arctic Circle (66°33' N) – the only military airship ever to do so.²

And so an insight. If the Arctic was to come alive on the page, I should see it for myself. Chasing false leads and dead ends, an invitation was realized. Host-to-be: the Canadian Ice Patrol, a government unit within the Atmospheric Environment Service. With the Patrol as host, I experienced firsthand much of the roof of North America – an alien³ realm a world-away from the teeming millions "back south."

Researching one story, I found another.

A cold trail had warmed late in 1988, thanks to the Air Attaché at the Canadian Embassy, in Washington. My inquiry: an overflight of the High Arctic in a military aircraft. Commercial rates into the far north (I'd discovered) are frightfully expensive. (Round-trip fare from New York to the RCAF base at Resolute, on Cornwallis Island on the Northwest Passage: over \$2,000.) [*Slightly more than \$5,000 in today's money*]

My inquiry was referred to Canada's National Defence Headquarters. After a follow-up written inquiry, the Director Information Services responded. Again: no luck. "I regret to inform you," the letter intoned, "that Canadian military aircraft do not make regularly scheduled flights to either Churchill or Resolute. . . The Canadian forces do, however, make a number of northern patrols each year with Aurora aircraft originating in Nova Scotia. Media passengers can be accommodated on these flights."



U.S. Navy airship ZPG-2 BUNO 126719 ("Snow Bird") moored to an expeditionary mast at the RCAF base, Resolute Bay, Cornwallis Island, August 8, 1958 – a half-day layover and, as well, a rendezvous unique in U.S. Naval Aviation. (U.S. Navy photo)



Ice Island T-3, August 1989. Calved from shelf-ice, this 7 by three mile, fresh-water slab provided a near-invulnerable platform for long-term scientific observation within the North America Arctic. (Author's photo)



Nunavut Province of Canada was the area covered during the Ice Patrol. Originating in Iqaluit (Frobisher), the author participated in three ice survey flights – Iqaluit to Resolute (Dark Blue), Resolute to Resolute (Orange) and Resolute to Iqaluit (Red). Arrowheads indicate route of flight with total air miles being about 6,000 miles. Note: This map is a reconstruction of the flight tracings recorded on an aeronautical navigation chart no longer available. The flight-tracks are idealized, straight-line segments instead of the actual track with its numerous course changes into inlets and channels.



Frobisher (renamed Iqaluit, July 28, 1989. An airfield was constructed here during WWII as part of the Crimson Air Route to Europe. It is the “jumping off” place for research and tourism for regions north. (Dunbar and Greenaway)

In spring 1989, having submitted further information, approval was secured for an August overflight. Two months later permission was withdrawn – a casualty of lacerating cutbacks in Canadian defense spending. Thus, the Canadian Ice Patrol was suggested. After all, Patrol aircraft (a friendly source explained) survey the same sectors – the mainland and Canadian Arctic Archipelago – gathering ice-reconnaissance data. Why? Sea ice limits marine operations (sealift) to a brief season in far-northern waters (break-up to freeze-up).⁴ Accordingly, an organized ice forecasting program is in place in support this annual sea-lift resupply.

Another query speeds north. Reply: In eight days. “We do carry journalists infrequently,” I read, “if there is a connection between their project and our program.” Authorized passengers, the message continued, are responsible for all transport, meals and lodging to/from the aircraft. Of course, deviations from the planned flight-track are impermissible. Moreover, if the platform is obliged to divert, passengers assume all meals and lodging at the alternate. Further, a standard waiver must be signed.



The author’s hotel at Frobisher: the Navigator Inn, basic yet adequate. (The author’s collection)

The offer was irresistible. “We will look after ground transportation and in-flight meals, Tom Kilpatrick, Chief, Ice Reconnaissance Division, Ice Branch, concluded hospitably. “You will probably have to be in Resolute for three or four days.”

Permission granted!

Off on an Adventure

That singular July, I meet (by prearrangement) a representative of the Canadian Ice Patrol at International Airport, Ottawa. Bernie Weyer, tall, dark-haired, is an ice observer for his government. A veteran of countless on-duty hours aboard icebreakers and aircraft – helicopters included. His employer: the Atmospheric Environment Service (AES) home for the Ice Patrol, itself a unit of Environment Canada, a federal department. Bernie is Arctic bound on another tour to relieve the field manager on Baffin Island, west of the immensity that is Greenland and about 1,200 miles north of the Canadian capital. There, at Frobisher (the largest settlement in Canada’s Eastern Arctic), he will join his colleagues, and the aircraft that will be my magic carpet.⁵

Remarkably, Bernie and I, plus an assortment of officials, native Canadians and adventurers, are deposited into the northlands via a Boeing 737.

Installed during WWII, Frobisher (renamed Iqaluit in Inuit) is sited on Baffin Island’s southeast littoral, near 64° North.⁶ A community of 3,000 in 1989, Frobisher is “The Business Capital of Canada’s Eastern Arctic” and, as well, a major administrative and government center. Though many of its buildings are new and its airfield modern and first-rate, to this polar tenderfoot some sections resembled a construction camp.

It is late summer – apogee of the melt season. At Frobisher, the fringing bay is ice-free. En route, however, the 737 had crossed the blue-black of Hudson Strait to our south – entrée to Hudson Bay. To Bernie’s seasoned eye, the Strait had been logged as “two-tenths” veneered by glittering pans of sea ice.

On arrival, I learn that my ride is cancelled. At the



Control tower and related aviation facilities, Frobisher, 1989. Frobisher is the largest settlement in Canada’s eastern Arctic.

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Sealift Announcement. Basically residents of the Northern Territories must order their year's supply for a single delivery during the late summer. (From the author's collection)

Operations Center (a well-appointed cluster of trailers), staff concern is palpable. The aircraft, a modified Lockheed Electra, is grounded: electronic gremlins haunt its avionics. As one consequence, no ice reconnaissance is being logged over the entire Eastern Arctic. (A second Electra, based in western Canada, is dutifully aloft)

I settle in and look around – for five days.

The delay is cruelly inopportune. Canada's annual Sealift resupply is underway. This is the needful resupply into the archipelago that, each melt-season, is obliged to await the annual breakup. Information vital to ship owners, ship managers, the Coast Guard, government transport officials, others. The Arctic summer offers a brief window of reduced risk and hazard – June through October insertion, depending on geography – for the assorted vessels steaming in to sustain far-northern communities. "Sealift Time is Coming! Arrange for your grocery orders now...." This precious inflow of year-round supplies everything: from food, fuel, furniture, lumber, vehicles – is sustenance for the communities and government outposts that dot the intricate map of Canada's mainland and, as well, its arctic and subarctic littorals – a complexity of bays, basins, channels and inlets. Sealift is a race – a crucial contest between northbound shipping and the fall freeze-up.

Why this mode of re-supply? Airlift costs are prohibitive for most bulk commodities. Except for Sealift, everything else must fly.

At Ice Central, Ottawa, at-sea reports and satellite data are available, certainly. But fixed-wing reconnaissance remains vital. What tracks should shipping steam through the labyrinths of Canada's Atlantic and Arctic Archipelago? The Ice Patrol maps of observations help to answer this annual challenge, a sustaining effort compounded by day-to-day shifts of the pack.

For the moment, the Patrol's Lockheed Electra, radio-call Canice One, is AOG (aircraft on ground). As the delay lengthens, the ice-forecasting center becomes increasingly hungry for detailed ice-related information. At last, the aircraft is pronounced ready for flight: a local test hop has proven satisfactory. The Electra checks out. In the meantime a new flight crew has arrived from the South, along with a replacement ground-crew. And, a flight-plan is actually filed. "There is likely to be a lot of High Arctic flying," my notes forecast, "in the next few days." Patience has granted its reward.



Ice Patrol personnel in pre-flight conference: members of the Atmospheric Environment Service (AES), Ottawa. (From the author's collection)

The morning arrives.

The aircraft is a Lockheed L-188-C Electra. Its sensor package adapted for the ice reconnaissance mission. Three Plexiglas bubbles pierce the airframe, one on each flank, a third topside. A sausage-shape side-scanning radar or SLAR⁷ is slung beneath its blue-grey belly. A garish red slash (The Canadian Maple Leaf) and the Ice Patrol logo brighten the "bird's" shiny complexion. Further, a "Canadian"[or Canada Air?] logo of the subcontractor caps the ensemble. Inside, Canice One" is equipped for both comfort and for purpose. A galley is provided. As well, four bunks are installed aft of ten first-class seats for off-duty rest-and-relaxation. Most impressive is the array of advanced electronics for navigation, communications, radar, laser, infrared, which cram the tube-narrow fuselage from galley forward. Only a narrow center-isle remains for aircrew plus a few enclaves between the twinkling consoles.

After WWII, ice missions were flown using military aircraft such as the British four-engine Lancaster. In 1956, however, when the Ice Patrol was created, DC-3s had inaugurated a more regular schedule of penetrations. Fitted for long-range, these venerable aircraft had done the job. Still, visual missions were



A tour of "the base" was granted, then dinner at the AES Operations Center (Arctic char). Here the Canadian Ice Patrol Lockheed Electra L-188-C on the apron at Frobisher (renamed Iqaluit), Baffin Island, Arctic Canada. Radio call: "Canice One." (From the author's collection)

necessary making, for example, flying into a fjord a potentially “dicey” situation.

In 1989, Wayne Parton was a pilot for Canadian Airlines International. An eight-year veteran of the Patrol, he had just completed a two-week stint with “my” Electra. “In those days,” he explained, “It was real arctic flying. They were down in the fjords, visual, no radar, no inertial. The navigation was by gosh, by golly, ‘cause you’re low level. There’s not too much celestial. Everybody had a map in their hand, reading along. . .”

In the mid-1960s, however, the DC-3 was replaced by the DC-4. When Canadian Air won the contract, in 1972, the Electra became the Patrol’s primary aerial platform. (Ice observers also serve aboard icebreakers.)

The Electra, Parton continued, is “infinitely superior to a piston engine, and specifically the DC-4. We can cover a lot more ground with our range, speed and pressurization capability. The dependability of turbine engines is also a major factor. The size of the airplane and the payload potential was another significant factor into making it a really comfortable operation.”

The Ice Patrol organization is responsible for a sprawling geography. One of two Electras therefore operate from east-coast runways; the other is based 1,400 miles west of Frobisher, at Inuvik, near the mouth of the Mackenzie River – a far corner of Canada’s Northwest Territories.

On the apron, pre-flight continues. “Leg-about,” the visual inspection of the aircraft, and a pre-flight on board by the 2nd officer and ground crew are concluded. The electronic equipment is fired up, glitches subdued. For his part, the navigator inputs the assigned flight-track, its coordinates and turn-points assigned by Ice Central, into the Flight Management computer.

The track had arrived at Frobisher the prior afternoon from Ottawa. Plotted onto the chart, it’s discussed among the navigator and pilot assigned – a consensus reached as to fuel required. With flight distances averaging perhaps 1,800 miles, and because alternates are few and scattered, usually this is “max fuel” – the aircraft at gross weight. Mission details settled, the other flightcrew members and maintenance personnel are briefed.

Standard flightcrew is four – pilot, copilot, navigator and flight engineer. I am introduced. Pierre Girard, a French-Canadian, occupies the flight deck’s left seat this morning. Short in stature, fiftyish and close-to-elegant in appearance, he had learned to fly at age 16 then worked as a bush pilot on a float-equipped Cessna 180. Pierre had joined Nordair in 1970 – the firm amalgamated into what is now Canadian Air. (Nordair won the contract in 1972.) Pierre’s log-book holds approximately 13,000 hours, including arctic time on the DC-3, Fairchild FH-227, and Boeing 737, on both regular (passenger) airline and cargo hours.

André Daemen is 1st officer: perhaps thirty-five, blond, friendly and gifted with a boyish expression. Acting as flight engineer is 2nd officer Jean Allard – solid, dark-haired, also in his mid-thirties. Immediately aft, to starboard, is the navigator’s desk. Today, Andy [last name forgotten] will man the electronic magic that will guide our (mostly) over-water

passage to our next (pre-programmed) runway. He is older, round-faced, thoroughly seasoned.

For the most part (I will learn), the pilots conveying Ice Patrol personnel are here by choice – having flown the 737, but now preferring the more freewheeling atmosphere and special challenges attending ice-reconnaissance flying. Here most airspace is uncontrolled.” That is, air-traffic controllers are few and the terrain magnificent. For their part, the first- and second-officers are here, probably, given their comparatively low seniority.

First Survey Flight

I’m invited to remain forward, for takeoff. Strapped into the observer’s seat, I assess unfamiliar surroundings, receive basic instructions and keep silent. Aft and forward, the flightcrew is immersed in its respective check-lists and pre-flight rituals – the quiet, absorbing checks and banter of professional flying.

As we taxi away, I’m presented a waiver to sign.

The climb out is over Ward Hall Peninsula, which forms the northern shoreline of Frobisher Bay. This day, the water is ice-free and gorgeous. A splay of browns pocked with blues then fills my windows – bleak lake-strewn tundra terrain.

At 9,000 feet the plane throbs northeast, to parallel the coastline of Baffin Island, the southeastern-most of the Canadian Archipelago, and larger than Sweden.⁸ Upon reaching Baffin Bay, the plane will swing to a northwest heading, to parallel the island’s southeast coastline – thence to the next leg of today’s mission. End-of-flight destination: a runway at Resolute Bay astride the Northwest Passage. Resolute is located near the 75th parallel, 900 miles from the North Geographic Pole and, at this moment, roughly 1,000 miles to our north northwest. Flight time will total seven hours. That is, the Electra will “crab” to Resolute, staying over water to survey sea-ice conditions and icebergs for which Baffin Bay is notorious.

A direct flight-path would serve no purpose.

The day’s mission is to survey waters southeast of Baffin Island before a course-change to surveil ice conditions in Baffin Bay, seaward of West Greenland. The Electra will then press west toward the Passage, and on to the haven at Resolute.

Thirty minutes out, 35 miles to seaward. To my left, the Arctic is on splendid display. Larger than California, Baffin Island is 700 miles long, the earth’s fifth largest island. Moreover, its rugged east coast mountain-belt is among the highest in eastern North America with dark, sculpted peaks beset by glittering icecaps and glaciers. Seaward, gray with smears of fog draping the water and have funneled inland via brooding fjords. Scattered ice pans sparkle on a sinister, blue-black canvass.

Visibility: unlimited: a splendid tableau washed by a luminous atmosphere.

The northeast corner of Cumberland Sound – an intruding arm of the sea, is our first turn-point. Greg and Andre are quietly chatting; to an untrained eye, no one is flying the ship. No hand is touching the controls. Via intercom, the navigator dutifully informs the flight deck: “Two minutes to turn-point.” I’ve no headset.



Author boarding "Canice One," 2 July 1989. Destination: the airfield and support facilities at Resolute on Cornwallis Island--on the Northwest Passage. Note the Plexiglas "bubble," topside. (From the author's collection)



Flight Deck: "Canice One" – pre-flight underway. Andre Daemen is 1st officer; acting as flight engineer and the 2nd officer is Jean Allard. (From the author's collection)



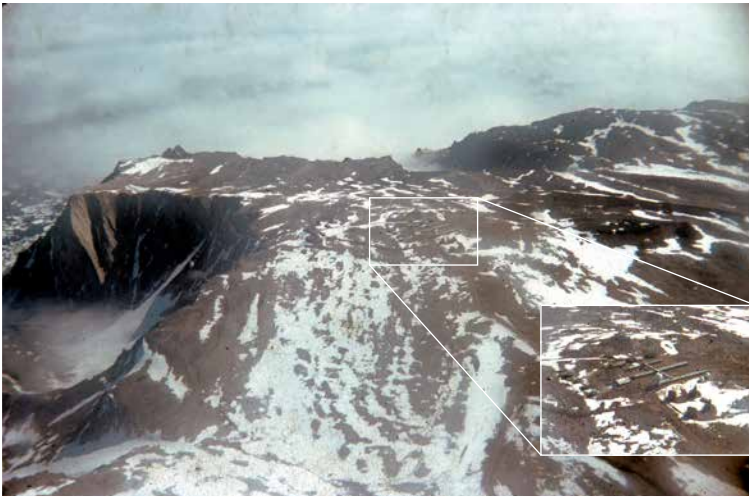
LEFT: Andy, the flight's navigator, at his position. (From the author's collection)

LOWER LEFT: Immediately aft of the cockpit to starboard is the navigator's position. Andy will man the electronic magic that will guide "Canice One's" ice-mapping flight to the next runway. (From the author's collection)

LOWER CENTER: One of the five AES "ice people" aboard: Bernie Wyer at the SLAR station – side-looking airborne radar. SLAR and visual observations will be integrated into an overall map-of-result. (From the author's collection)

LOWER RIGHT: Crewman manning the aerial fax, "Canice One." (From the author's collection)





Cape Dyer, Baffin Island shortly after take-off from Frobisher. Baffin Island is the southeastern most island of the Canadian archipelago. Note the Distant Early Warning (DEW Line) site atop the sea cliffs, inset. (From the author's collection)



East coastal mountains of Baffin Island, here shrouded in sea fog. Over Baffin Bay "saw Greenland and flew into [Northwest] Passage." (From the author's collection)

Abruptly, the left wing dips and the nose drops. The aircraft is answering an electronic command from the inertial navigation system (INS), into which the mission coordinates have been preprogrammed. The Electra swings dutifully to its new heading – the two airmen unperturbed – and, thankfully, do not look to read my face as we sweep through a 35-degree arc.

These operations are largely uneventful, even mundane for flight crews. Normally, the autopilot “flies” the platform throughout a mission: it can handle the navigation far more accurately and keep the wings level better for the SLAR radar. “We just monitor,” I’m informed.

Cape Dyer is the island’s east-most extremity. A DEW line station (Distant Early Warning), someone offers, caps the point, which lies astride the Arctic Circle. A relic of the Cold War, the DEW Line – a string of radar outposts arcing across the northern tier of North America and Greenland. The outpost just ahead is operational – work site for a handful of contractor personnel. A radome eases from a light haze, barely discernable – a mere pinpoint atop a sheer cliff which looms a thousand feet, more, above the sea.

Another turn, this time to the northwest: to parallel the Cumberland Peninsula. When this leg is concluded, the Electra (obedient to its computer commander) will assume a north-northeast heading – 90° to the coast, towards the unseen Greenland massif.

The waters of Davis Strait then Baffin Bay spread away, below. This is “iceberg alley.” Interposed between Canada from Greenland, its surface offers an icy mélange. Hundreds, perhaps thousands of “bergs” float in splendid parade: huge, sullen loners with sea-skirts of aquamarine as well as scattered fleets adrift in rude formation. Sea ice (frozen seawater) also is impressive. Congenitally restive, the shifting, smashing pack produces a cracked, buckled surface horrendous to cross on foot and formidable even to icebreakers. From the air, the

floes proffer a remarkable blanket – cleaved by the zig-zag of straight lines ending in acute angles – “leads.” Floes grind together into immense, compacted masses or, instead, disperse like ships into scattered cakes isolated by dark smears of open water. When pushed together by current or wind, vast rafts of broken ice coalesce – each slab contributing to the variegated pattern of line.

The range of color – blues and white – is remarkable. The hues and their intensities are, I discover, a function of the available light – and condition of the sea ice itself.

The Patrol presses to within 30 miles of the Greenland coast, near Melville Bay. This sector of the world’s largest island is a major calving area – an immense tongue of the ice cap. Even veteran airmen, I’m told, are at a loss to describe the Greenland littoral. A superb writer-airman writes thus:

We were silent and each thoughtful in his own way, measuring ourselves against this garish, brooding wilderness, and there came upon us a certain spell . . . And as we continued, assimilating little by little the dominant hostility of this land, we knew the sensation of being dwarfed to nearly zero proportions; we became far more diminutive than even a thunderstorm could render us. We were as gnats in the sky and were accordingly cleansed of ego.⁹

Beyond my privileged window is the largest glacier outside of Antarctica. In ethereal light, the glistening, rumpled sheet sags to the sea as immense tidewater glaciers. At their snouts, the bay is strewn with uncountable icebergs: radiant points splayed on a canvas of pale gray-blue. Dark smudges – coastal mountains of naked, alpine bedrock – protrude feebly from the encircling white which arches away to the limits of visibility.

Each melt season, West Greenland calves between 10,000 and 15,000 icebergs. Propelled northward along the coast, some

then drift southward along the eastern littoral of Baffin Island, Labrador and Newfoundland. In heavy ice-years, indeed, the Labrador Current may deliver bergs to the vicinity of the Grand Banks – and the great-circle shipping routes.

We press to within 30 miles of Thule Air Force Base (AFB) – Greenland’s largest. A wing drops and as the Electra obediently assumes a new heading. Jogging from 65 to 60 degrees west, we turn south – to survey a parallel stretch of Baffin Bay.

The human eye is an indispensable search-tool. Augmented by SLAR, the search is vastly enhanced. Of course, the radar “sees” father, extending coverage to each side of the flight-track. In petulant weather and months-long dark, the advantage is plain. Assisting: a laser unit, which measures the height of pressure ridges (deformed, thickened ice) and an infrared sensor; it measures temperature. The latter can detect objects in the water at altitude – useful in cloud and dark.

Our Electra has all-weather capability. Moreover, it is a stable platform and, the airmen offer, forgiving. The ensemble, in short, is a first-rate platform for-purpose.

We chance upon Polar Star, an American icebreaker. In the northlands, before introduction of aircraft particularly, navigating into the wrong place could consign a luckless crew to wintering-over. The history of polar exploration, indeed, is replete with tragedy both afloat and ashore: ice-locked ships, wintering through the dark-time, horrific suffering and deprivation. The modern vessel below – a puny toy – is churning south through a broken, pallid blanket of white.

As we pound south a copy of our (incomplete) ice chart is transmitted to the ‘breaker via high-frequency radio. This is what the older ice-observers like best: providing direct support to shipping.

On this leg, I’m offered the left-side (pilot’s) seat. Without a word, the co-pilot elects to go aft, leaving me alone on the flight-deck. Awash in self-satisfaction, I savor these singular minutes. Again, I’ve no headset – that is, I am the only one aboard unaware of an upcoming turn-point. Abruptly, the right wind dips steeply and the nose drops – answering its electronic commander. As the Electra sweeps a 90-degree arc onto a north north-westward heading, I melt in wordless terror. I’ve touched not a dial or any control – have I?

The Electra pounds north-northwest for Lancaster Sound – east entrance to the Northwest Passage. From the flight deck – I’m there still, the fabled east-west highway spills west into the archipelago in a light haze. Scattered “bergs” pock a

dark, placid sea. To port, the dark-chocolate peaks of Bylot Island slide astern. Its glaciers once plowed shoreward, not quite to water’s edge. Now, instead, ribbons of meltwater ooze across broad, dark beaches. To starboard, the flat-topped cliffs of Devon Island brood on the Passage . . . a scene etched in memory.

Closing on Resolute – Barrow Strait below, “Canice One” approaches Somerset Island. Off its northeastern tip an islet slides beneath. A prominent checkpoint, it is flat-topped and engirdled by banded cliffs that stand sheer on the strait. For the first-time visitor to “Res,” the spectacle of its bold cliffs – and the remarkable setting all about are unforgettable. Across the Passage (north) is Cornwallis Island – a flat table-land. We are far north of the so-called tree line.¹⁰ No hint of green intrudes onto the tans and browns: this is the High Arctic – a polar desert nearly devoid of vegetation. Here, the few species able to defy protracted cold, scant moisture and months of dark are ground-hugging, scattered and few.



Resolute

“Canice One” eases onto gravel – one of two runways here. For the Electra, someone offers, gravel is “no problem.” The aircraft has logged 2,000 air-miles: more than seven and a half hours aloft. Here ground crew will attend the Electra. The “maintenance boys” accompany the aircraft from one base to another – or if planning a fuel stop. This team is comprised of one “mech,” an engineer and an avionics technician. Each is self-sufficient – each man has to be. All spare parts are carried en route plus an auxiliary power unit (APU). Extra parts, let alone assistance, are as scarce here as swim ware.

By temperate standards, the facilities at “Res” – both working and living – are spare and improvised; luxuries are few. Still, aircraft-maintenance and servicing are available. Even a QEC (quick engine change) can be logged in four to eight hours.

Our “hotel” is the Narwhal Arctic Services inn, just off the apron. As at Frobisher, lodging is basic yet adequate.



The airport apron at Resolute. (From the author’s collection)



The tableland topography of Cornwallis Island. (From the author's collection)



No Inuit had settled Cornwallis Island until 1953, when four families were moved to Resolute—five families more joining in 1955. Here the Inuit community is visible near the distant high-ground. (From the author's collection)

(Adjusting to 24-hour daylight, however, can be difficult.) The dining hall is host to fascinating, diverse patrons: grizzled laborers – here to re-grade the runways, chat with seasoned specialists in satellite communications. Academic scientists, airmen and government employees crowd nearby tables. The “base” – as everyone calls it, is remote, austere, fascinating. Frobisher (comparing) is a sea-side suburb. Here, the flavor is military, with a splash of construction camp.

In the Canadian Arctic Archipelago, the continental platform is broken into thousands of islands framed by a myriad of bays, channels and straits – the Northwest Passage among them. Unlike the geologically complex, rugged topography of the Eastern Arctic, Cornwallis Island is ideal for a base: an unobstructed tableland of broken, flat-lying bedrock. The cinnamon-hued terrain is rolling, the horizon a rounded, weary contour – shattered bedrock and gravel debris.

The Ice observers referred to Cornwallis Island as “the asteroid.” The label is apt, given its aspect.

The local economy is based on both native and white. The Inuit settlement on the bay’s gravel-shore is an invention of Ottawa – descendents of native Canadians relocated here in the 1950s – an act to reaffirm sovereignty. Hunting and trapping are still practiced. Wage-income (oil and gas exploration, tourism, research) centers on the airfield and the access it offers. The base was established in 1947, when a weather outpost and, later, a military airfield, were installed. Resolute is a key communications and administrative center – centrally-located and a staging site for scientists en route elsewhere into the Archipelago. In 1989, base Resolute logged about 5,000 “movements”: commercial, research, charter (tourism), military aircraft. Few private pilots reach these runways.

Second Survey Flight

Next day, a second probe is logged. We cross the island’s high-desert plateau, tracking northwest. Having examined the channel between Cornwallis and Bathhurst Islands, the Electra drops back south – returns to the Passage – and there speeds west – charting sea ice. By August, the waterway’s eastern arm

is largely ice-free – confirmed that day. However, to the west of Resolute Bay, typically, the Passage is blocked by multi-year floes – old, deformed and formidable sea ice. Off the southwestern tip of Bathhurst Island, our flight-path crosses the North Magnetic Pole. Invited to come forward, I watch as the magnetic compass “walks” in wild circles.¹¹

Departing the Passage, the Electra speeds northwest – to overfly the Queen Elizabeth Islands. Perhaps the most inaccessible in the High Arctic, this island-group fringes the deep polar basin. About 100 miles short of the Canadian Polar Margin, a turn-point pulls “Canice One” onto an easterly heading. We will traverse the long axis of the Arctic Islands, paralleling (more or less) the rim of the Arctic Ocean. Ahead objective: Ellesmere Island, about 400 miles ahead.

In this remote sector, sea ice is multi-year – and unbroken. Little open water darkens a pallid surface. For the inexperienced, map-reading north of the tree line is difficult. The terrain resembles the map only where snow-free or nearly so – perhaps two to five months each year (depending on latitude). Otherwise, the terrain is mantled; except for areas of bold relief (changes in elevation), deep-snow obscures lakes, rivers and coastlines.

Port-side, the sea-ice canopy arcs away fully to the Pole – brilliant and forbidding. We press slightly east of Mackenzie King and Borden Islands; the latter borders the Arctic Ocean. Both are flat, featureless tundra-plains. Despite superb visibility, I am unable (from 4,000 feet) to distinguish land from sea ice.

Each crewman is engaged. The navigator and the ice-observer field manager are, probably, busiest. Still, to relieve tedium, positions are rotated. As well, moments are found for coffee, badinage, a meal, call of nature. Among the five “ice people,” one is minding the SLAR station, port-side, analyzing the imagery; another is manning the plotting board – coordinating the inflow of data, integrating the SLAR and visual observations into an overall map-of-result. A third occupies the communications seat. “Upstairs,” an ice-observer – a digital readout of our precise coordinates attending, reads sea-surface conditions as we pound pass, classifying ice-types visually. (Radar can be fooled.)



Northwest Passage: sea ice on approach to the haven at Resolute, Cornwallis Island. (From the author's collection)

These penetrations adhere to a pre-programmed track. What was once a more or less autonomous operation has shed flexibility – a trend disturbing to some. “We would customize our track right on site to suit the requirements of the shipping,” John Comeau, a seasoned ice-observer, had told me back in Frobisher. “And the control of the shipping used to be more or less at the discretion of the captain of the icebreaker. Now, the Coast Guard has their operational offices – and these sort of direct the overall view.” That may well be more efficient; still, local on-scene control has shifted south.

Special requests spice an operation. The aircraft might drop low for a closer look, to help classify the ice or to inspect an oil slick or an unusual object. “You have to be careful when you’ve descending,” Parton noted. “The highest recorded iceberg is 500 feet above water. So that’s usually the lowest level we go to. “Of course,” the airman said, “if we get some visual, we’ll go on down to any level they want within reason, including quite often, 50 feet.” By 1989 – my sojourn, no significant incidents marred the Ice Patrol record in nearly 18 years of operations.

Ellesmere Island nears – the most mountainous in the Archipelago. The terrain is mostly mountain or high plateau.¹² This is the farthest-north of Canada’s islands – indeed, it extends nearer to 90° North latitude than any land except Greenland. Tracking north, the straits and channels twist to the outpost at Eureka – on Ellesmere’s west littoral. This settlement is one of but three habitations installed onto an empty massif.

A position report is transmitted to Eureka Operations. “Are you going to land here in Eureka?” a female voice replies. “No.” “That’s too bad. I was hoping you would stop in and take me to Hawaii.”

Mere miles north of Eureka: the next turn-point – east, to transect Ellesmere. It will mark my north-most penetration: 80 degrees, 30 minutes N. This leg will be flown in fog. A summer phenomenon, sea fog results when warm moist air is advected over cold water. And so the United States Range – at 8,500 feet, the highest in eastern North America is crossed unseen. Water again below, a 100-degree swing is taken to track south-southwest, to resume the gathering ice data. Kennedy Channel

is the liquid-ribbon connecting Baffin Bay with the Arctic Ocean. It separates Greenland from Ellesmere. At mid-channel – the border with Greenland – the Electra’s heading (compass direction) is parallel to Ellesmere’s eastern littoral.

Earlier, at Frobisher, Andy had assured me that both Ellesmere and Greenland are among the North’s most spectacular terrains. The panorama to starboard confirms his remark. The island is dominated by ice: five ice caps inter hundreds of square miles of underlying terrain. This dome of frozen water arcs to 6,200 feet above sea level, alpine peaks puncturing girdles of white that, luminous in the crystal, dust-free atmosphere, curves away to horizon. Scores of glaciers coil from a blank high-interior to reach deep, yawning fjords. There, crumpled ice-fronts kiss the sea; calved free, icebergs parade in grand disarray between sheer rock-walls. The ice enfolding Devon Island – to the south – will be smaller in scale yet grand.

This is noble, timeless terrain – at low altitude a window into the last Ice Age. Devon Island is south of Ellesmere. It is smaller yet diverse – topographically. Most impressive: rugged, ice-capped highlands oozing glacier tongues. West of its highlands the terrain is plateau – not unlike that of Cornwallis Island, adjoining. In sum, these particular flight-hours have been intense, incomparable – transcendent: fleeting minutes frozen-fast into memory.

Yet, it must end. A succession of turn-points has shifted our position progressively westward, toward Resolute. “Res” to starboard, a concluding turn (over the Passage) delivers touchdown.

Third Survey Flight

My third, and last, flight with “Canice One” is a reconnaissance of the channels, straits, and bays south of Resolute – thence a long run southeast toward Frobisher over Melville Peninsula. There the terrain has low relief (change in elevation) and also elevation – an emptiness of tundra browns. We again cross the Arctic Circle: 66 minutes, 33 minutes north.

Foxe Basin adjoins Hudson Bay; the former unrolls beneath – rough, heavy ice. We then track southeast, through Hudson Strait. From January into June, this entrance into Mr. Hudson’s inland sea is blocked by heavy sea ice.¹³ Moreover, icebergs harry the Labrador Sea beyond, throughout the polar year.

Our final leg is largely over subarctic landscapes: destination Frobisher. With little ice observation to chart, permission is granted to ride “upstairs,” in the bubble. I scramble up. The seat is swung up beneath me – locked in position. Legs dangling in the aisle, my head and chest project above the tube of this aircraft. Immediately ahead is the droop of its nose; behind and near, the four turbines whine. Save for the Electra’s tail and wings, I can scan – unobstructed – the full ring of horizon. We skim a low, soggy taiga at 250 knots, dropping slightly over the lower elevations and skimming the higher wrinkles as we push for Frobisher. The experience is overpowering: “Better than Disneyland, huh Bill?” André teases via intercom – to general amusement. Adrenalin racing, I sputter: “I don’t want

it to end!”

But of course, it does.

I had witnessed the end of an era: the legacy and the romance – detachment from the crowded South. And no less: the Electra-as-platform. “It was the perfect airplane for this kind of operation, allowing lots of versatility,” pilot Parton remarked. Most ice observers, I inferred, were no less fond. Nonetheless, in May 1990 the model was phased out; no ice reconnaissance using the Electra would again be logged. The decision (some believe) was premature; still, no complex operation can sustain itself on romance or nostalgia. Instead, time for the next generation of ice-reconnaissance platforms.

The 1980s closed out an acceleration of change for the Ice Patrol – the aircraft and equipment as well as flight operations, deployments, budgets. Increasingly (as in most professions) ice reconnaissance is hostage to new technology – ever-advancing technology. The trends were plain: higher altitudes, deploying newer, more capable sensor-suites. For three decades, maintaining contact with the ice-surface had been the name of the game. “You’re losing contact with the ice at low enough level where you can recognize the detail,” John Comeau lamented. “You’re losing, I guess, the thrill of it all.”

“Insofar as arctic flying is concerned,” Pierre told me, well-after my Patrol hours, “I consider myself privileged to have experienced it, because of the natural beauty and the challenges.”

Though admired as platform, the ice-observing Lockheed Electra was phased out. Replacement: the De Havilland Dash-7, a four-engine STOL (short take-off and landing) performance turbo-prop. The Challenger 600, moreover, was comparable in sensor suite to the Electra. At 400 knots, in five hours the Challenger could log a track equivalent to that of the esteemed, if discarded, Electra. Patrol altitude: 35,000 to 42,000 feet.

Afterword

Ice affects marine transportation in the navigable waters of mainland Canada and – certainly, in the Northlands. To warn of hazardous conditions, Ottawa continues to modernize its ice-information services since my welcome in 1989 from the Canadian Ice Patrol. Current mission-statement for the Canadian Ice Service (CIS), branch of Canada’s Department of the Environment and Climate Change (Environment Canada): ... to provide the most timely and accurate information about ice in Canada’s navigable waters. As a result, we promote safe and efficient maritime operations and we help protect Canada’s environment. →



Flight crew “Canice One” back on deck, exchanging reflections and anecdotes. (From the author’s collection)

Endnotes

1. Ice islands are slabs of freshwater shelf-ice calved free from an ice shelf. Thick, stable, and long-lived, ice islands have been exploited as platforms for scientific investigation (e.g., T-3).
2. In July 1931, the rigid airship *Graf Zeppelin* (LZ-127) explored and photographed the islands north of European Russia. Northernmost penetration: 81° 50' N.
3. All the waters of the Canadian Arctic are ice-covered for part if not all of the year. Coverage and duration, however, is a function of oceanographic and meteorological factors – as well as local variations. “Among the most important are surface area and depth of water; amount of tide and current; and orientation of the channels and bays in relation to the prevailing wind.” Dunbar and Greenaway, *Arctic Canada from the Air* (Canada Defence Research Board), 1956, 415.
4. Inception of ice information services: the 1950s.
5. “Aircraft have played an enormous part in northern exploration and settlement. The mapping of arctic lands and the exploration of the inaccessible Arctic Ocean have been immeasurably speeded up since the advent of air transport, and so have the northward progress of settlement and development of resources.” Dunbar and Greenaway, 480.
6. The airfield at Frobisher Bay was part of the Crimson Air Route to Europe (Second World War). It is located 1,225 miles north of Ottawa.
7. SLAR: side-looking Airborne Radar (microwave signatures). “The ice information extracted from the SLAR and the successful integration of the SLAR with the aircraft navigation system, ushered in a new age as far as ice reconnaissance was concerned.” DDIAS IDEAS (newsletter), Development Division of Ice Centre Environment Canada (ICEA), Issue No.3, (June 1987), 1.
8. Excepting Baffin Bay, the channels of the Canadian Archipelago lie on the continental shelf which borders the North American mainland – and joins it to Greenland.
9. Ernest K. Gann, *Fate is the Hunter*, Hodder and Stoughton, 1961, 188-89.
10. “Tree line” is a misnomer. It is a zone in which trees diminish in size as, gradually, they disappear altogether—the boreal coniferous forests giving way to open woodland in which trees are stunted and, finally to a dense cover of tundra in which scrub birch and willow, berry, lichens, and other species dominate.
11. That is the place about which the earth’s magnetic field is focused in the northern hemisphere; it is located hundreds of miles from the geographic pole. All magnetic compasses point there, not to true north. Depending on one’s position, allowances for the displacement.
12. Geologically: a Precambrian highland. The Canadian Shield—the core of the North American continent, is a Precambrian lowland.
13. Hudson Bay is shallowing as Earth’s crust rebounds from the weight imposed by the continental ice sheer of the Pleistocene (“Ice Age”). Geologists call this isostatic rebound.